How to solder when you can't see the join! p. 44

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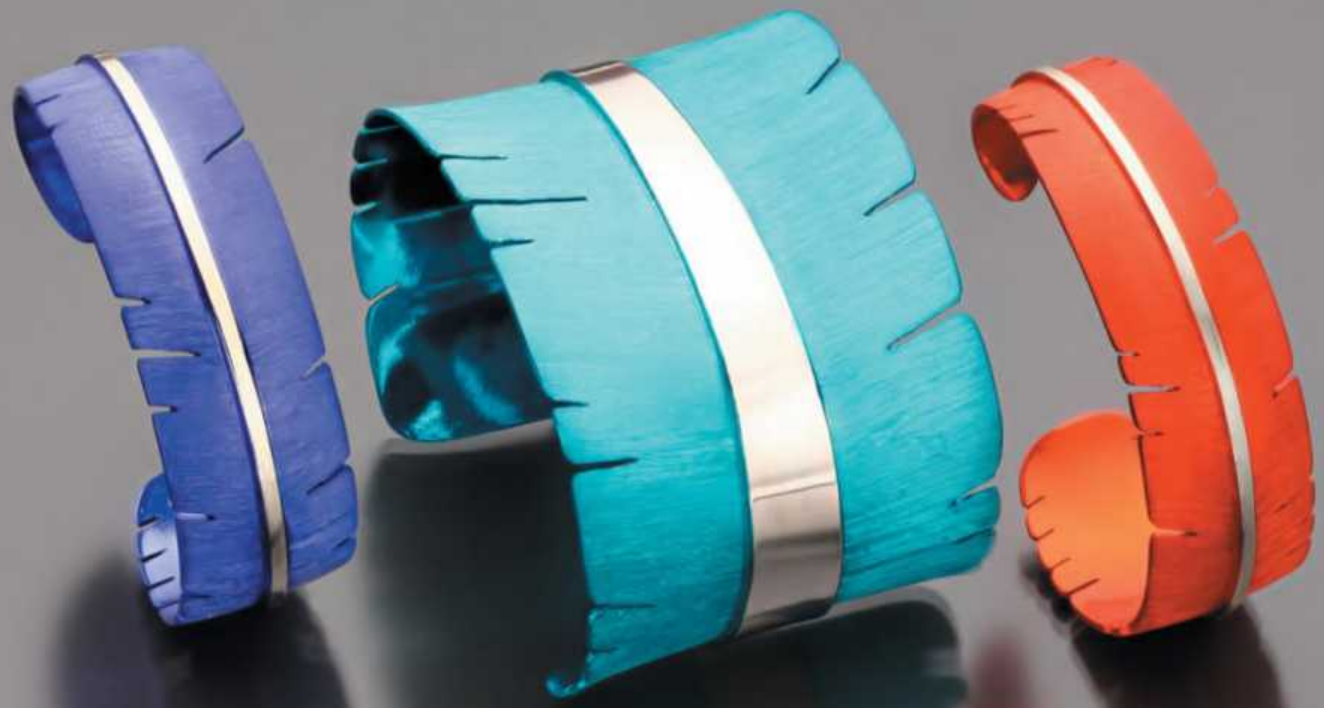

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January 2016

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NEW SERIES!
60

features

HOT! trending technique

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Crossover culture

For his column in this issue, Christopher C. Darway writes about what he calls "Crossover Tools" (*page 20*) — tools originally intended for another purpose (even another industry entirely), but which jewelry makers latched onto and made their own. Look a little further, and you'll find this is extremely common among jewelry artisans. What's important is not what the tool was designed to do, but what the tool can be made to do. Michael David Sturlin, in "Make Your Own Forming Block" (*page 24*), talks readers through the steps of making a handy wooden bench tool. Along the way, he offers some encouragement on using perhaps-unfamiliar woodworking tools: spade and auger bits, a wood drill, and a Japanese-style carpenter's saw. "Once you get over the scale," he writes, "you'll see they work just like your familiar jewelry tools." Again, forget about the labels; think about what the tool can do, how it functions, and how it can function for you.

What's important is not what the tool was designed to do, but what the tool can be made to do.

The most extreme (and amusing) example of this tool-repurposing or tool-invention habit we encountered while working on this issue was in Jeff Fulkerson's article, "Soldering Hidden Joins" (*page 44*). So what did Fulkerson use to get the cool texture on his metal — a hammer? A punch of some sort? Turns out it was just a common rock.

Crossing over isn't just limited to tools. In this issue, we have a spotlight on a material that first surfaced in the industrial world, including the automobile industry. Powder coating is essentially enveloping a piece of metal in a polymer powder, which is then melted and cured. The result can be brightly colorful or completely transparent, and in both modes has been embraced by jewelry makers. Why should makers limit themselves by what's printed on the label? Paying attention to what the material can do — add color or seal a surface airtight — makes labels irrelevant. And that should appeal to any artist.

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TOOL REVIEW

Dremel Fortiflex

Known as the maker of the most-common rotary tool you can get at your local hardware store, Dremel has recently unveiled the Dremel Fortiflex. They've entered the pendant-motor game — and they're putting up a good fight. If you've been making jewelry for any length of time, you've likely asked yourself (or the *Art Jewelry* staff or groups on Facebook) whether you should get a Dremel or a Foredom. Until now, most of the rotary tools Dremel offered were bulky, cumbersome tools that weren't exactly suited to continuous use by serious jewelers. They didn't have the finesse and flexibility required. Now they do.

A step up from their previous flex-shaft attachment (permanently attached handpiece, shorter shaft, etc.), the Fortiflex offers a standard #30 handpiece and three-jaw chuck that accommodates any of your favorite flex-shaft accessories (up to a 5/32-in. [4 mm] shank). The handpiece is even marked with a cute little arrow so that you know what direction it's spinning. It comes with a mounting bracket for suspending the motor as well as hanging the handpiece when it's not in use, a variety of sanding and grinding accessories, a small drill index (1/32–1/8 in. [0.8–3.2 mm]), a chuck key and allen wrench, and a variable-speed foot pedal. I tested the Fortiflex and found that it behaved just as I expected it to. No surprises, and it was easy to assemble and use. I did notice that the motor's a little louder than the flex shaft we have in the *Art Jewelry* studio, and the chuck's action is a little tighter.

If you're on the fence about getting a flexible-shaft machine and haven't decided exactly which model to buy, the Dremel Fortiflex should be on your list as an option. Should you ditch the flex shaft you've had for 20 years if it's still running smoothly? Probably not. But, should you consider the Fortiflex when thinking about what to add to your studio? Absolutely. The bonus is that you'll likely be able to find it at your hardware store if you need to have it "right now!" —*Annie Pennington*

WHERE TO BUY

Dremel Fortiflex
$239.00
www.dremel.com

2nd place, 2015 polymer clay category: *Earning My Stripes,* by Staci Smith.

CALL FOR ENTRIES

BeadDreams

What: Each year, The Bead&Button Show hosts BeadDreams, a juried contest that draws competitors from around the world. Accepted pieces are displayed for the duration of the Bead&Button Show (June 1–13, 2016) in Milwaukee. Ribbons and prizes, sponsored by a selection of top jewelry-supply companies, are awarded for each of the 10 categories, which include polymer clay, wirework, and finished jewelry. This year, the competition introduces metalwork as a brand-new category.
For more information: www.beadandbuttonshow.com/beaddreamsrules

See past winners in the BeadDreams online gallery: **www.beadandbutton.com/beaddreams**

CHALLENGE

WINNER!

Penny Cordova, *Rebirth* necklace

Each month, *Art Jewelry* hosts a free online design challenge on a different selected theme. To play, upload an image and short description of your work (up to two entries per person) that fits that month's theme.

Inspiration: "I wanted to create a piece inspired by my love of the beautiful, exotic jewelry of Egypt. Also, I love jewelry with moving parts, which was the inspiration for the movable wings!"
Materials used: Brass, sterling and fine silver, blue and green onyx.
Dimensions: Pendant: 2½ x 3 in. (65 x 80 mm).
For more information:
www.pennystreasures.wordpress.com

Discover this month's theme and submit your work: **www.artjewelrymag.com/designchallenge**

TOOL REVIEW

Patrik Kusek's Woodland Chic Texture Sheet and Idea Kit

Although it's not apparent by looking at my studio space, I harbor a secret affection for organization and order. Patrik Kusek's Woodland Chic Texture Sheet helps me nurture this affection by grouping 30-plus woodland-inspired stamps into one handy 8 x 10-in. (20.3 x 25.4 cm) texture sheet. With fine lines, crisp details, and a variety of texture sizes, I found it easy to make beautiful impressions in polymer clay. It's great for metal clay, too!

And, if the texture sheet isn't enough to get you out of a creative slump, more inspiration can be found in the Woodland Chic Idea Kit. The kit is reminiscent of a set of baseball cards. But instead of athletes and stats, the mini deck showcases 13 artists and their texture-sheet-assisted creations from a variety of mediums. While the kit is not a step-by-step, it will tell you what texture each artist used and give you a general list of the fabrication techniques for each piece, plus some helpful tips for your next project.

All in all, this concentration of inspiration would be a welcome addition to any studio. *—Theresa D. Abelew*

WHERE TO BUY

Patrik Kusek's Woodland Chic Texture Sheet
Woodland Chic Texture sheet $31.95
Woodland Chic Idea Kit $10.99
www.patriksstudio.com

SPOTLIGHT READER TIP #1

Hardware-store-inspired Tool Holders

Straight drawer pulls make great holders for pliers and other hand tools. They allow you to store your tools vertically where they can be easily seen, and you can make sure you keep plenty of space between your rows of tools. I mounted several pulls on a pine board and then hung the board. They are secure, and I only end up with two holes in the wall. They also double as a great way to hang in-progress pieces and necklaces in a pinch!
— Maria Lothrop, Mechanic Falls, Maine

We're looking for your best studio tips and tricks! We've made it easy to submit your ideas — go to www.artjewelrymag.com/tipsfromourreaders and share your tips with us. We'll choose a new spotlight reader tip for each issue; If your tip is chosen, you'll receive a $100 gift certificate courtesy of our Tip sponsor, Contenti (www.contenti.com)!

***World Traveler Handbags* by Kathleen Dustin. Polymer, boar bristle, and rubber, 2014.** Photo by Charley Freiberg.

CONFERENCE

EuroSynergy2 Conference:
Uncork Your Creativity

What: When Bordeaux, famous for its rich history of wine, was chosen as the host city of the 5th International Polymer Clay Association's Conference, the conference's theme came naturally: "Uncork Your Creativity." With a dozen artist-led breakout sessions for small groups, and several sessions open to all attendees, there are programs for all skill levels. Presentations cover topics ranging from technical instruction and demonstrations to practical business information to nurturing the polymer artist's creative practice. Push your skills during the conference with maker challenges, or stick around for the post-conference workshops.
When: July 10–13, 2016; Post-conference workshops July 14-16.
Where: Mercure Hotel Bordeaux Centre, Bordeaux, France
For more information: www.eurosynergyconference.net

***Under Cover* brooch by Loretta Lam. Polymer clay with nickel pin back.** Photo by Bob Barett.

***Promesse du Jardin* necklace by Jeffrey Lloyd Dever. Polymer clay and anodized niobium, 2014. 10 x 6 x 1½ in. (25.4 x 15.2 x 3.8 cm).** Photo by Gregory R. Staley.

WORKSHOP

Metal Clay: Hinges and Movement

What: During this advanced workshop taught by Joe Silvera, discover how to add elements that swing and spin, hinges, and wire safety clasps with metal clay. Over the two-day course, you will design and create two pieces of jewelry with movement. Because of the advanced nature of the class, please be sure to see the website for prerequisites.
When: January 30–31, 2016
Where: Silvera Jewelry School, Berkeley, Calif.
For more information: www.silveraJewelryschool.com/classes

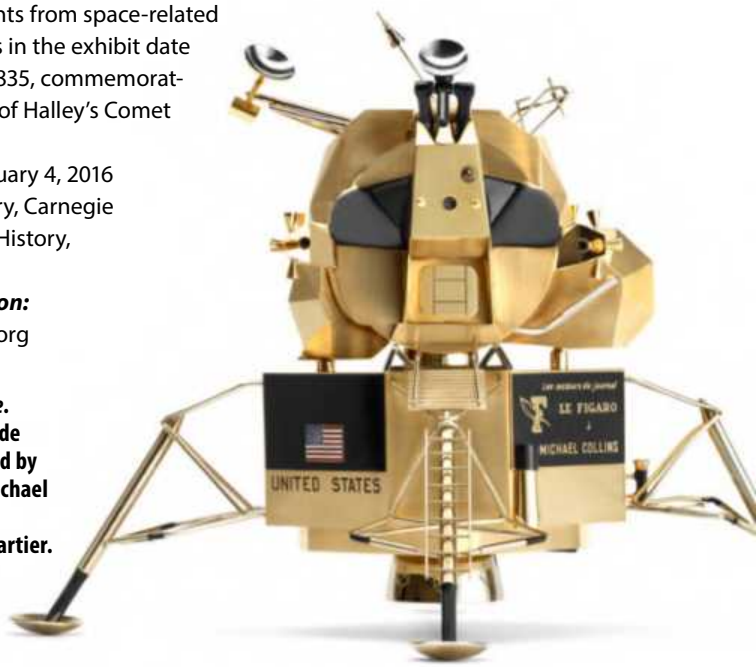
Photo courtesy of Silvera Jewelry School.

EXHIBIT

Out of This World!

Jewelry in the Space Age

What: Jewelers' fascination with outer space predates Sputnik and will continue far beyond our complicated relationship with and our drive-by of Pluto. "Out of This World" brings together nearly 200 wearable and decorative objects inspired by landmark moments from space-related history. Some pieces in the exhibit date back to as early as 1835, commemorating the appearance of Halley's Comet in that year.
When: Through January 4, 2016
Where: Wertz Gallery, Carnegie Museum of Natural History, Pittsburgh, Pa.
For more information:
www.carnegiemnh.org



Lunar Excursion Module. **Cartier Paris, 1969. Made for and formerly owned by Apollo 11 astronaut Michael Collins. Nils Hermann, Cartier Collection. © Cartier.**

Book review

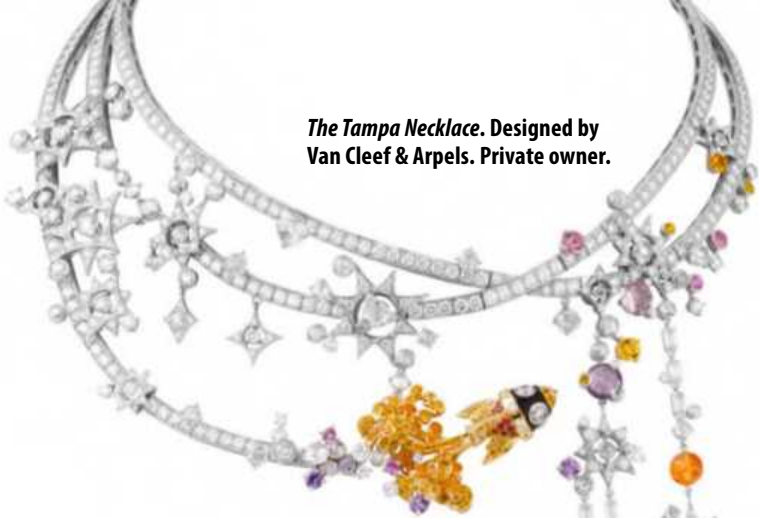
Jewelry Metals:

A Guide to Working with Common Alloys

Technical Editor: James Binnion

ISBN 978-0-9799962-2-1
MJSA 2015
150 pages
$34.95 (MJSA members: $29.50)

At a time when inaccurate metalsmithing information can spread faster than you can blink, *Jewelry Metals* is a breath of fresh air. Tech-edited by master metalsmith James Binnion, you can rely on the information held within the book's pages to guide you through the working properties of gold, silver, platinum, palladium, and nonprecious metals — and the alloys of each. In addition to practical information about specific alloys, *Jewelry Metals* includes seven illustrated technical how-tos (including mokume gane, anodizing, and granulation), explanations of international stamping and marking regulations, and tips for keeping track of and refining your metal scrap for maximum returns. This is the technical jewelry-metals reference book your studio has been longing for. —*Annie Pennington*



***The Tampa Necklace*. Designed by Van Cleef & Arpels. Private owner.**

***Necktie* by Megan Isaacs.**

***Dynasty Ring* by Marc Schneider.**

***Pol Bury Suite*. Designed by Pol Bury. Private owner.**

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Getting a Handle on Consignment

by Marlene Richey

Once you decide to sell to stores and galleries, you'll hear the word "consignment" pop up. (Another word for the same practice is a "memo" transaction.) So, what does consignment mean, and is it a good idea?

Consignment is an agreement that you will put your jewelry into a store, and the owner will pay you when a piece sells, instead of buying your work outright. This can be a opportunity to get into a gallery that you've always wanted to be in, or it can be a disaster. Given the two extreme options, be prepared before taking on this commitment.

6 considerations

There are some things you should think about before agreeing to put your work into a gallery on consignment. They are:

1 Do you know the store's reputation and its credit history? Don't take it on faith — ask! Ask other designers you know who have worked with the store. Ask the store for credit references or other independent jewelers that they have worked with, and call them! If you're a member of the Jewelers Board of Trade, you can request a credit report.

2 Does the store carry other designers on consignment? If you're the only one, it's worth wondering why that is.

3 Do you like the way they display the work of jewelers in the store?

4 Can you afford to tie up merchandise for a period of time? Consignment sales don't necessarily tick over quickly, and sometimes never pay off.

5 What do you hope to get out this business arrangement (besides money)? Consignment can be a way to establish a good working relationship with a store; think about what you're getting out of it, even if your jewelry sits in the store for a couple of years and doesn't sell. The upside is that it's a way to test a geographical area that you might not have tried before. If your work doesn't sell, you've learned something, even if it's that it's not the right market for you.

6 What sort of commitment is the store making to you? Will they advertise and promote your work? Host events for you? Will they commit to a minimum number of sales? Ask if they'll commit to buying your work outright after a trial period if your jewelry does well — and be sure that you know what they consider "doing well."

"In the jewelry industry, a 'memo' transaction, also known as consignment, allows a party to hold a supplier's product for a specified period of time while a buyer is sought. The holder of the product pays for it only if a sale is made; otherwise, at the end of the specified period, the product is returned to the supplier. This is a widespread practice in the industry used for generations."

—*"The Essential Guide to 'Memo' Transactions," the Jewelers Vigilance Committee*

Out of business?

One aspect of consignment that can be a nasty surprise comes if the store declares bankruptcy. According to the Jewelers Vigilance Committee, "In a bankruptcy, a bank may show up and assert that all the property in a merchant's possession, including memo goods, is collateral for the bank's higher-priority secured loan." Talk about a nightmare scenario: Your jewelry is confiscated to be applied toward the store's outstanding debts. Never mind that now you're (morally, if not legally) one of their outstanding debts.

To protect yourself, file a UCC-1 financing statement in the store's home state. This form is essentially a legal public notice that you have a financial interest in the debtor's property (yes, it's *your* property really, but you don't want to argue that with the bank). Visit the Jewelers Vigilance Committee's website at www.jvclegal.org for more information about this process.

Put it in writing

The most important thing you can do (besides thoroughly researching the store) is to have a written consignment agreement signed by both parties. Below are some of the most important points that should be covered in the agreement:

Contact information

Include all addresses and contact information for the gallery owner and yourself. Either party should know how to contact the other at any time — even if one is at their summer home in Florida, or their cabin in the mountains!

Time frame

Give them a deadline, and set out clearly the dates the jewelry will be delivered, and when it will be returned in case of non-sale. This will prevent a store from hanging on to jewelry for years, or cycling it out too quickly if it fails to sell. There's a time period that will make you both happy — find it.

Ownership

Put it in writing that *you* own the jewelry. Consignment does not change that.

Shipping agreements

A fair standard agreement is that you cover all costs sending the merchandise to the store and they will do likewise when they return it. Packaging, postage, and insurance should be covered. Spell it out.

Prices

Include a detailed list of your jewelry prices. Either request the wholesale price be paid to you or set a retail price and ask for a certain percentage. Be sure to specify if you don't want your jewelry to be discounted or put on sale.

Payment details

What is the time period for payment? You can opt for a monthly, quarterly, or semi-annual payment. Just be sure that you both know what's expected. Don't hesitate to contact the owner/buyer to check on the monthly progress of the sales.

Loss and damage

Make it clear that the store is responsible for the jewelry while it is in their possession and until it is returned safely to your studio; any loss or damage is their responsibility. Require that they keep the jewelry clean and in good condition while in their possession. If there is a problem with the craftsmanship, require that the store notify you immediately upon receipt. A reputable store will inspect the jewelry upon arrival as matter of course. Make it clear that any needed fixes — whether due to craftsmanship or damage — are to be done by you. Damaged pieces should be returned to you for repair or replacement. Your name is on the piece, and you need to be able to speak for the quality of any repairs.

Inventory list

This seems obvious, but it's worth saying. List all the pieces being delivered, item numbers, specifications, and prices.

Display requirements

You may wish to require that the jewelry you send be shown as a collection. If the store knows their business, they'll probably be doing this anyway. Good stores and galleries know the value in establishing an artist's name, and showing a collection is one of the clearest ways to do that.

Non-exclusivity

Market exclusivity is a privilege, and a big bargaining chip. Until the store places a minimum order and becomes a customer in good standing, they should not get exclusivity in their geographical area.

Right of return

If you need a piece — for a competition, a show, etc. — you have the right to have it returned. The store must package it securely, ship it, and cover the insurance.

If you're good at reading between the lines, you can see in that list of recommendations all the ways that consignment can go spectacularly wrong. Consignment is not, by definition, a nightmare — it's just that when it goes wrong, its potential to go wrong is impressive. Consignment also can be a positive, income-generating, relationship-building practice. Just be sure to go into it with your eyes open, a well-thought out plan in hand, and confidence in the store with which you are working. AJ

In more than 30 years in the jewelry business, Marlene Richey has run a wholesale business and a retail gallery. She can be reached by email at ***marlenerichey@gmail.com****.*

Crossover Tools

by Christopher C. Darway

Tools define who we are. Open a toolbox and you will know the trade, hobby, or vocation of its owner. The feeling you get handling a timeworn tool — wondering where it's been, who owned it — is hard to describe. Also, while I like the familiarity of my favorite old tools, I equally enjoy the feeling of a new tool and getting to know it. Here are three fun hand tools you may have never tried (plus a bonus tool): one is invaluable and used frequently, one's useful for its purpose but only used periodically, and the third has a one-of-a-kind use but isn't used often for making jewelry. At least not in my studio.

Three hand tools

Roper-Whitney No. 5 Jr. Hole Punch

Some tools are crossovers, meaning they are used in different disciplines, usually (but not necessarily) for the same task. In the automotive or sheet-metal industry, the Roper-Whitney punch (*below*) is used to punch precise holes in ferrous and non-ferrous metals up to 16-gauge (1.3 mm). The seven hole sizes range from 3⁄32 to 9⁄32 in. (about 2.5 to 7 mm), including the oft-used 1⁄8 and 1⁄4 in. (3 and 6.5) sizes. The punched hole is clean, without burrs or distortion. Think of it as the Crafted Findings rivet-and-punch tool's big brother. Instead of a screw movement, it uses lever action to punch the hole.

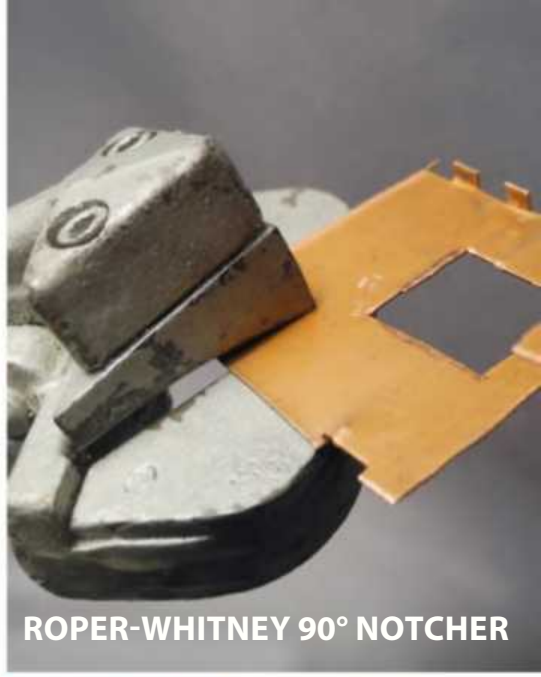
Its primary purpose is to make a hole. But here's a little bonus for us jewelers; Each punch operation produces a little scrap disk that works great for jewelry design. The male part of the punch has a cone-shaped tip for finding the center of the hole to be punched, so the resulting disk has a slight dimple. The dimple can be left for a design element or flattened. I sometimes tap the disk flat with a planishing hammer or just squeeze it with parallel-jaw pliers.

This punch isn't a cheap tool, running anywhere from $70 to $144, so make sure you'll have a use for it. There are imported knock-offs that are okay, but they will never have the longevity of the Roper-Whitney.

ROPER-WHITNEY NO. 5 JR. HOLE PUNCH

Roper-Whitney 90° Notcher

This notcher (*above right*) is a specialized hand tool used in the sheet-metal industry for cutting 90° notches in 20-gauge (0.8 mm) mild steel. Actually, not many jewelry people will use it, but it sure is cool. At the time I got one of these tools, I was making hydraulically formed boxes for an element on one of my lighting designs. Each pattern needed four 90° corner notches. I was using 18-gauge (1.0 mm) aluminum sheet, which is easy to saw or shear, but not easy to make consistently shaped, undistorted notches. This tool changed the task from laborious frustration to "wow, this is fun!" Definitely worth the money spent. For the longest time, I thought they were not being produced anymore, but I found a number of sources online. There are no knock-offs that I'm aware of, due to its rather limited use. Don't ask if you can borrow mine.



ROPER-WHITNEY 90° NOTCHER

The Nibbler

Sounds like a character from a Batman comic, doesn't it? (Turns out, it really *is* a character on "Futurama!") Nibblers (*opposite page, top*) were used in the radio and electronics fields (remember radios? There was a time when hobbyists built radios and other electronic devices) to produce

THE NIBBLER

Photos by Christopher C. Darway.

a rectangular-shaped hole in a metal box which would become the radio's chassis.

Let's say you need a square hole in the middle of a sheet of metal. First, drill a hole in the metal. The size of the hole you drill is determined by the size of the nibbler's cutting head, usually ¼–7⁄16 in. (6.5–11 mm). Instead of inserting a saw blade in a saw frame and piercing the square, insert the nibbler's head into the hole from below. It's an odd tool in that you work the lever part of the tool from underneath the sheet with the cutting part of the tool sticking up through the hole.

You can also nibble from the edge of a sheet of metal to cut tabs for tab and slot fabrication. Create jagged cuts by aligning the tool at a 45° angle to the edge of the sheet. Another perk: replacement cutting edges are available.

Now, for the bonus tool

Slip Roll

A slip roll (*below*) is similar to a rolling mill but it has a third roller set behind the two front rollers. Most are hand cranked. The rollers are smaller in diameter but longer in length than those on a rolling mill. They adjust like the rolling mill, but are not used to compress the metal; instead, they grip and feed the metal against the third roller in the rear. The metal is deflected by the rear roller and comes up and around, forming a tube. This tool was designed to make cylinders, tubes, and pipes, but for jewelers, the slip roll is great for forming cuff bracelets or round hollow forms. On the end of one of the front rollers are three to five graduated grooves used for forming wire into a hoop. The downside of the slip roll is the small diameter of the rollers. Usually they are 1-in. (25.5 mm) diameter. This diameter increases as the length of the rollers get longer.

I have two 12-in. (30.5 cm) slip rolls. Why two? I bought the first one from Harbor Freight way back when shipping was free. They were located in California (I was all the way on the east coast), and I had given up on the idea of making one from junkyard scrap iron. The second, I commandeered from a school I was teaching at that had closed their metals department. I saved it from the landfill. The Harbor Freight model is still being made and sold under a few other brand names.

SLIP ROLL

What to buy

Of the tools I've talked about, the nibbler is a fun one to try. And for about $13.00, it won't break the bank. If you've read my column for any period of time, you know how I feel about cheap tools. Well, I'm making an exception for the nibbler. You might like this tool. I have both an Adel nibbler and a cheap import, and I'm sure there's a replacement blade stashed away somewhere in my studio.

*Christopher C. Darway can be reached via email at **cdarway@outlook.com**.*

To use a nibbler for jewelry, see Christine Terrell's "How to Make Upcycled Tin Blossoms," in our May 2014 issue, or buy the project at **store.jewelrymakingmagazines.com**.

Photo by Christine Terrell.

Make Your Own Forming Block

by Michael David Sturlin

Many metalsmithing projects — both large and small — use sinking, which is forming metal by forcing it into a depression. This is the preliminary step in many processes: making channels, tubing, spiculum cylinders, and other hollow forms. Sinking can be done using a variety of tools: steel hammers; wood, nylon, and Delrin mallets; wooden dowels; and wooden or steel punches. The metal is typically sunk into carved depressions in tree stumps and wooden forming blocks.

MAKE A SPICULUM
Take your new forming block for a test drive! See "Classic Hollow Form: How to Make a Spiculum," *page 50.*

Making a groove block

If you haven't worked with them before, don't be put off by the woodworking tools; once you get over the scale, you'll see they work just like your familiar jewelry tools.

Material choices

I prefer hardwood (like oak) for its strength and durability. Softer wood (like pine) may be shorter lived, but is still functional for forming thin sheet metal.

Given a choice, go for 2-in. (51 mm)-thick boards or standard 2 x 4-in. pieces of lumber. If you repurpose scrap materials, common construction lumber will work.

Drill bit options

The drill bits you choose will determine the sizes of your grooves. Choose the sizes that suit you and your work; I drilled a series of seven holes for my blocks:

- 0.313 (5/16) in./8 mm
- 0.375 (3/8) in./9.53 mm
- 0.5 (1/2) in./13 mm
- 0.625 (5/8) in./16 mm
- 0.75 (3/4) in./19 mm
- 1.0 (1) in./25 mm
- 1.375 (1 3/8) in./35 mm

Photo by Michael Sturlin Studio.

Layout

Check the wood you're using for defects such as cracks, splits, and knot holes. When you lay out your drill holes, avoid these trouble spots. Use a ruler and pencil to draw a line lengthwise across the board.

NOTE: Drilling holes in the center of a board, then sawing it lengthwise, produces two blocks with matching grooves. If the wood is too narrow to get two blocks from one board, stack and clamp two boards together, one on top of the other. Draw a line 1 in. (25.5 mm) in from one edge, and position the drill holes along that line. This makes it possible to produce two blocks with one set of drill holes.

Locate the centers for the drill holes by placing the widest part of the drill bits across the line, allowing ½ in. (13 mm) of space between holes. (These spaces will be the ridges between the grooves.)

Drill the holes.

I used a cordless drill and paddle-shaped spade bits **[A]** to drill my holes.

⚠ **SAFETY NOTE:** Spade bits remove wood aggressively and can be hard to control. Be sure to clamp the boards securely, that your work surface is stable, and that you use eye and respiratory protection.

A good alternative to spade bits are auger bits **[B]**, which look like corkscrews. Auger bits are well suited for the task of boring straight holes through thick wood, and are easier to control than spade bits.

Run the drill at a slow speed and keep the bit perpendicular to the board, not at an angle.

Watch the splinters!

Both spade and auger bits have a tendency to splinter the edges of the hole as the bit comes through the other side of the board. To minimize this, use C-clamps to secure your board to your work table so that the marked holes are over the edge; this way, the drill bit can pass all the way through. Drill a small pilot hole all the way through the board at the center point for each hole. Switch to your larger bits, and drill only halfway into the board at each pilot hole. Then, flip the board, re-clamp it, and use your pilot holes as guides to drill into the center of each hole from the other side. This will minimize splitting, but does require a lot of bit-switching.

An easier way? Clamp your board to a piece of scrap wood, and drill through the board into the scrap wood.

Your first time drilling with these bits might not yield the most beauteous results. Remember, you aren't creating a piece of sculpture; functionality matters more than appearance.

Saw it apart.

Use a wood saw to cut through the center of the holes and separate the two halves of the block.

I use a Japanese-style carpenter's draw saw **[C]** for small-scale woodworking projects. This particular saw is functional and inexpensive, lightweight and flexible. It is double edged, with both coarse and fine cutting teeth. It's a draw saw — just like a jeweler's saw! Cutting on the pull stroke means the movement of the tool is very similar to a jeweler's saw.

Refine the grooves.

Once you've sawn the block apart, the bottoms of the grooves and the tops of the ridges may be rough and uneven. To refine these surfaces, use a large half-round wood rasp or a bastard file. I use a vulcrylic wax file, a common coarse file available from most jewelry-tool suppliers. The advantage of the wax file is that like the draw saw, it has two cuts in one tool and the tapered pointed ends are handy for filing various-width grooves.

Refine the inner contours of each groove first with the coarse file and then with the fine. (Be sure to straighten and refine the sides of the grooves as well as the bottoms.) Angle the file at the ends of each groove to slightly bevel the edges. You'll need to smooth the ridges between the grooves as well.

File all the other edges and corners into bevels or slightly rounded surfaces. Taking off the sharp edges will help keep the wood from splitting during use.

Ready to use

I don't usually refine my blocks past a filed surface. Just rub them with a bit of vegetable or mineral oil to keep them from drying out and they're ready for use.

These wood forming blocks may not last a lifetime, but the ease (and joy) of making exactly what you need offsets any limit to the lifespan.

If you want a longer-lasting tool, you can splurge for a good piece of hardwood. Check with your local building-material or specialty-woods purveyors to see if they have a cut-off bin; you might find just the right piece at a bargain price.

Being a maker

Most jewelry makers have to be occasional tool makers, or at least tool modifiers — altering stock tools to suit their particular use. There is extra joy that comes from working with a tool you've made yourself or modified. That satisfaction is another perk of being a maker! AJ

*Michael David Sturlin is an award-winning goldsmith, jewelry artist, and educator. Contact him via email at **michael sturlinstudio@cox.net**.*

taper your grooves

Left unaltered, the forming grooves are straight. But there are benefits to having tapered grooves for projects such as forming a tapered spiculum.

It is simple enough to expand the grooves once they're cut. Just use a saw and file to widen one end of each groove to tapering shapes.

To lay out a block with tapered grooves, space the center mark for the holes slightly further apart (¾ in./19 mm), allowing enough room for material to be removed at the ends of the grooves to widen them.

If you're making a block with tapered bays, you may need fewer holes, because you'll get a greater working range within each groove.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Powder Coating Explained

With a wide range of colors and a super-durable finish, powder coating gives jewelry makers a new way to play and protect at the same time.

by Theresa D. Abelew and Annie Pennington

What is powder coating? Powder coating is a dry finishing process of coating a metal object with a fine polymer powder, which is then heated to fuse into a solid, strong, long-lasting coating. Commonly used in industrial environments, powder coating is gaining popularity with jewelry makers due to its ease of use and low cost. It's often used as an alternative to liquid coatings, such as paint, because of how well it resists dripping and sagging.

⚠ Safety

- Work in a well-ventilated area to avoid breathing fumes created while curing.
- Wear a respirator or a particulate respirator to avoid inhaling the powder.
- Wear safety goggles with side shields (powder is slightly abrasive).
- Wear disposable gloves, closed-toe shoes, long-sleeve shirts, and an apron.
- Avoid generating unnecessary dust, and keep open flame away from the powder. When dust is dispersed in the air in sufficient concentrations, it can be a potential explosion hazard.

Metal preparation

Anything left on the surface of your metal will be trapped by the powder, so it's crucial that your metal is clean. Scrub your jewelry with a degreaser to remove any dirt, oil, or rust. You can also use an ultrasonic cleaner. For cast objects, bake them at a temperature above the temperature you'll use to cure the powder to outgas them and remove any impurities. Wipe your metal with a lint-free cloth dipped in acetone; do not touch it after cleaning it.

Application

There are two ways to apply powder coat: electrostatic spray deposition and dipping/fluidized bed. The results are similar, but they require different tools and materials. For both, make a fine-gauge-wire hook to hang the piece from in the oven.

Electrostatic spray deposition

The most common way to powder coat is with an electrostatic system. These systems include a spray gun with either a container for powder or an element onto which you attach the powder canister, a power supply, a method to propel the powder (either mechanical or air-powered), and a ground wire. This ground wire must be attached to a conductive hanging system in a spray booth onto which you hang your piece, thereby grounding it.

As the powder particles exit the gun, they become charged, and are attracted to the grounded metal, creating an even coat. If the metal isn't grounded, the powder won't stick to it. The excess, oversprayed powder can be recovered and reused. See "Supercharge Your Sealant! Powder-coat Your Patina!" on *page 36* to learn how to use an all-in-one power-coating system (*above left*) to electrostatically powder-coat jewelry to protect a patina.

Tools & materials:

- Powder-coating gun (an all-in-one system or a gun with an air compressor capable of 5–30 psi)
- Spray booth
- Wire hook (to hang your piece from while spraying and in the oven)
- Copper hanging system (onto which you hang the hook and attach the ground wire)
- Powder coat
- Convection or toaster oven dedicated for nonfood use

Dipping/Fluidized bed

Some production powder-coating applications skip the booth and gun and utilize a fluidized bed. A fluidized bed is a two-tiered container with a powder chamber above, an air chamber below, and a porous

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non-jewelry objects

- Fishing jigs (*above*) and lures
- Car parts
- Dog kennels
- Outdoor furniture
- Fire pits
- Doors
- Gates
- Mailboxes
- Bubblers (non-Wisconsinites: water fountain)

membrane separating the two chambers. The membrane is porous enough to allow air to pass through, but solid enough for the powder not to fall through. (Liken it to a coffee filter, which allows water to pass through, but not the coffee grounds.) Air is pumped into the lower chamber, and forced up through the membrane and bed of powder. The powder particles become suspended in the continuous air flow. The particles not only give the appearance of boiling liquid, but also behave more like a fluid, allowing metal to be easily submerged, or "dipped" in powder coat.

But that still leaves the issue of adhesion. Without an electrostatic charge, the powder won't stick to the metal without assistance. After the metal is clean, it must be heated. Once hot (roughly 175–200°F/79–93°C), the metal is immersed into the powder coat. The powder melts on contact and bonds to the hot metal. Excess powder is tapped or blown off the piece.

While it is possible to build a simple fluidizing bed with a few easily obtained items, the dipping method can further be simplified to work without the fluidizing bed. The hot metal can be dipped directly into a container of powder, or the powder can be applied using an enamel sifter. (See "Make Powder-coated Ombré Earrings," *page 32*, to learn this method.)

Tools & materials:

- Metal hook (to hang your piece from in the oven while curing)
- Powder coat
- Container or a fluidizing bed
- Insulated tweezers
- Enamel sifter (optional)
- Convection or toaster oven dedicated for nonfood use

Curing/flow-out

After your jewelry is coated (whichever method you choose), place it in a toaster oven or convection oven to cure. Your powder manufacturer will provide a recommended time and temperature after "flow out" — the point at which the powder changes to a glassy, liquid coat (about 200°F/93°C). It will take practice to find the ideal powder thickness. If you apply too little, the coating will have a grainy, tight orange-peel texture; too much, and you'll have a large orange-peel texture that's more prone to chipping.

Masking methods

When used in the automotive industry, powder coating isn't meant to be applied to every inch of space. It adds bulk, which is great for smoothing out small dings and dents, but isn't desirable everywhere. Bolts need to be threaded, logos need to be seen, and pieces need to be (re)assembled. The same is true when powder coat is used for jewelry. Components like ear wires and bezels, or even design elements need to be kept free from stray powder coat.

Uncured powder that's been electrostatically applied can easily be removed with a damp finger, cotton swab, dry paintbrush, or cloth, but sometimes it's necessary to mask the area instead. High-temperature polyester masking tape, fiberglass masking tape, silicone plugs, precut powder-coating disks, and even vinyl stencils are commercially available.

To create a two-tone effect, apply a base coat and cure it. Allow the piece to completely cool. Follow the manufacturer's instructions to apply a mask to the areas you want to remain the first color (it's easier to remove if you leave a tab of the

powder finishes available

- Primer
- Flat/Matte
- Satin
- Semi-gloss
- Gloss
- Texture/Wrinkle
- Veining
- Metallic
- Mirror
- Transparent
- And more!

mask off one side of the piece). Apply the second color. Return the piece to the oven and let it return to flow-out temperature.

NOTE: If you use high-temperature tape, you can leave the mask on past the flow-out stage. If you use vinyl or other types of tape, remove it at flow-out, or the adhesive will break down and the tape will become embedded in the powder coat.

As soon as the piece reaches the flow-out point, remove it from the oven and use tweezers to carefully remove the mask. It can be a bit of a dance trying to maintain the correct temperature; if the piece gets too cold, the tape pulls ragged edges in the color; too hot, and the tape will pull little strings of powder (much like gooey cheese on a hot pizza). Depending on how long it takes to remove the mask, it may be necessary to return the piece back to the oven or use a heat gun to get it back up to temperature several times before the mask is completely removed.

When should I powder coat?

Powder coating should be one of the last steps in your fabrication process, after you've completed all steps requiring heat. Because heat may damage stones, apply the powder coat before you set the stones (remove dry powder from the setting before curing).

Durability

One feature that makes powder coating such a desirable material to work with is its durability: once it's cured, powder coating is resistant to scratching, chipping, and fading. While it is possible to scratch or chip powder coating, when it is properly applied and cured, it is more durable than traditional liquid paint.

There are also different types of polyester powders, each with specific uses and characteristics, like UV protection or higher chemical resistance. These factors aren't often a concern when used for jewelry.

Removal

It is possible to remove cured powder coat from a piece, but it does require some effort and mess.

- **Chemical:** To effect a chemical "peel," you'll need specialty powder-coat strippers or paint strippers that contain methylene chloride. This method is efficient, but dangerous, and requires specific safety precautions. Be sure to don chemical-safe gloves, safety goggles, and a respirator, and follow the manufacturer's instructions for safe use, storage, and disposal.
- **Mechanical:** Less efficient but safer than chemical removal, mechanical removal requires elbow grease or a specialized set-up. Sandblasting is good; if you don't have a sandblasting setup, you can outsource your sandblasting. You can also use a wire brush on a bench grinder, coarse abrasive paper, or flex-shaft accessories.
- **Heat:** A third alternative is to burn off the powder coat. This is recommended only for small parts, as it will alter the temper of your metal and remove patinas. Be sure to work in a well-ventilated area or outside.

Storage & disposal

Store powders in a cool, dry place (approximately 77°F/25°C) for up to two years (performance may deteriorate after that).

Check your powder's Safety Data Sheet (SDS) for proper disposal practices. Most powder coat is nonhazardous, but some may contain chemicals that require special handling. With proper powder recovery (keeping the booth clean between colors and saving oversprayed powder), the at-home jeweler shouldn't have to worry much about disposal. AJ

powder vs. paint

- Unlike paint, powder coating doesn't require a solvent; no VOCs are produced.
- You can recover excess powder for reuse.
- Powder coat is generally applied twice as thick as is paint, yet it still remains flexible after it is cured.
- Powder coating is longer-lasting and resists wear.

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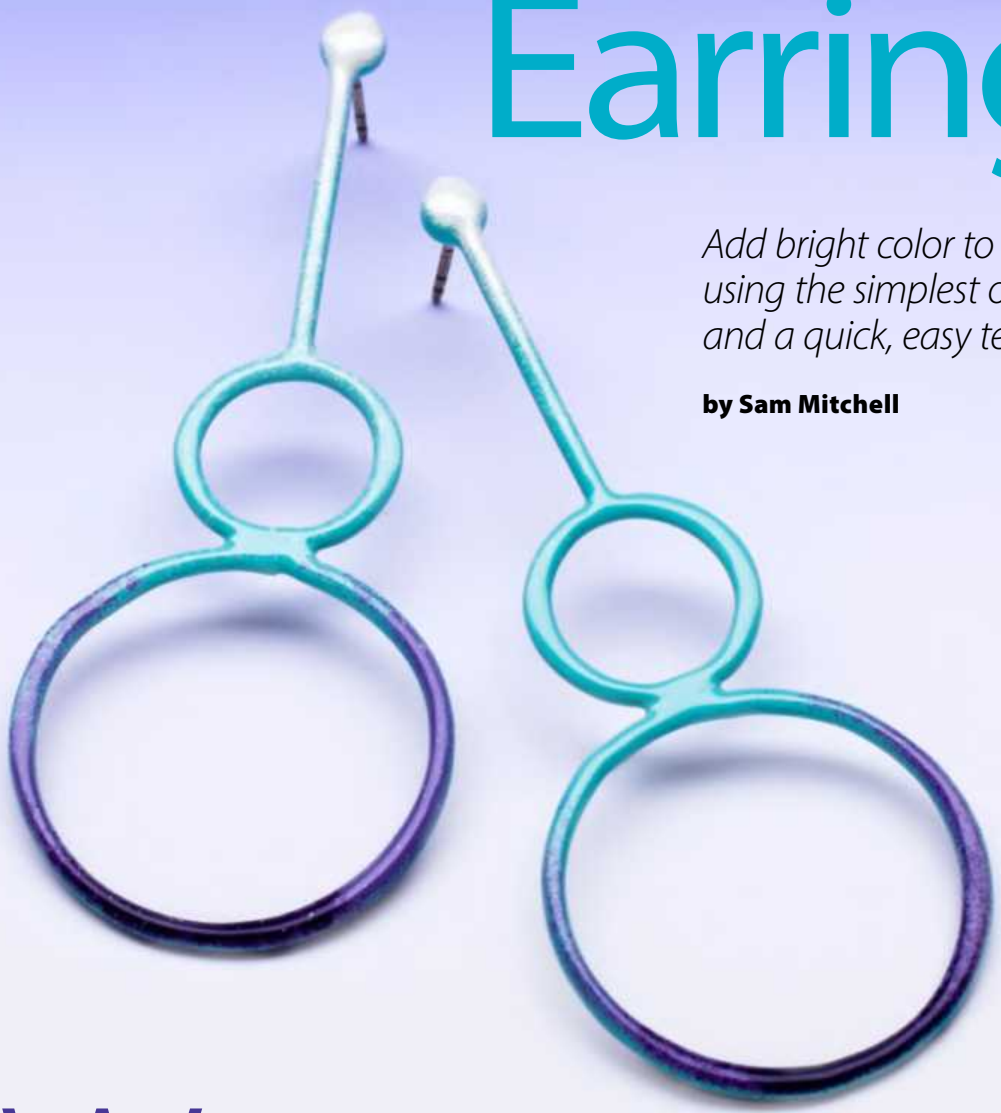
three stages of powder coating

1 LOOSE POWDER

2 APPLIED POWDER

3 CURED POWDER

Make Powder-coated Ombré Earrings

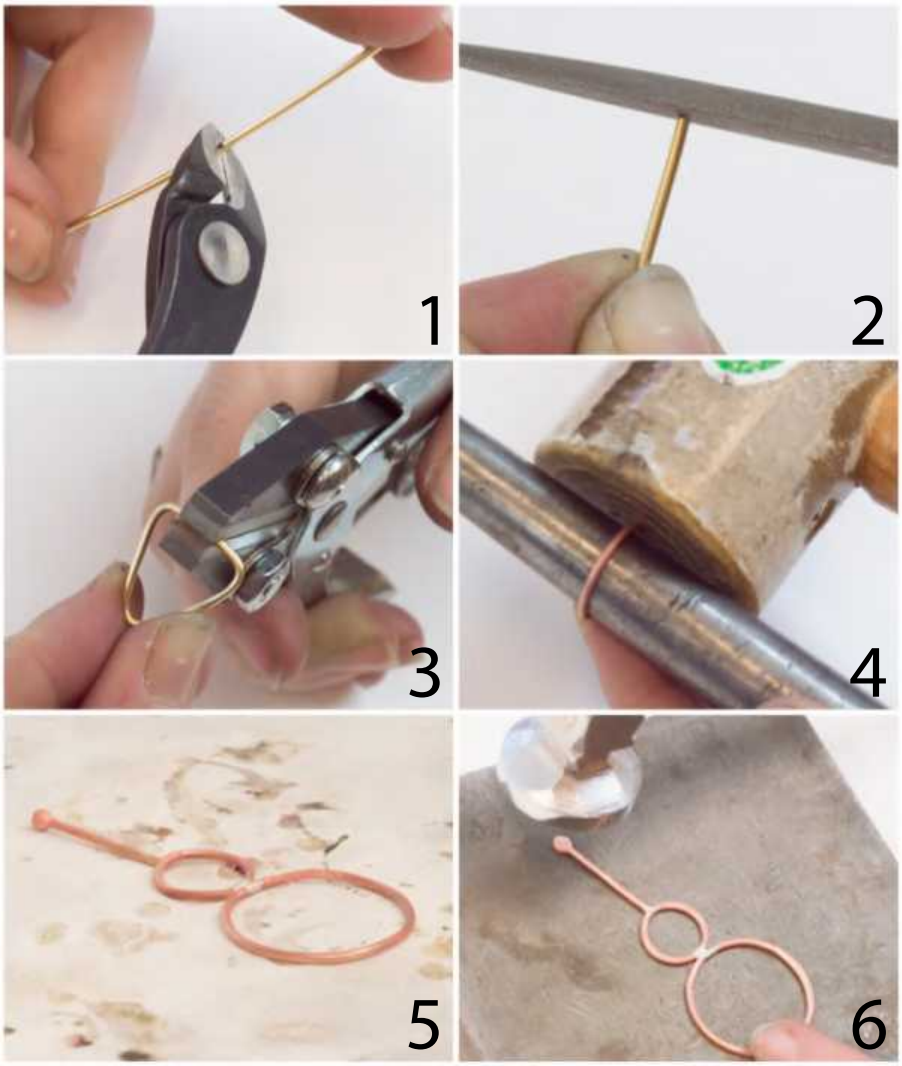


Add bright color to base metal using the simplest of tools and a quick, easy technique.

by Sam Mitchell

We live in a world that is bursting with color, and that inspires me every day. As a color fanatic, I want my work to reflect this inspiration. Powder coating is an industrial application that allows my love of color to shine, without the time and financial investment required for enameling. It is a process that can easily, safely, and inexpensively be adapted for at-home use.

HOT! trending technique



materials

- Brass wire: 16-gauge (1.3 mm), amount determined by design
- Earring posts with pad: sterling silver, 2
- Powder coat: color, opacity, and amount determined by design

toolboxes, *page 77*

- Wirework
- Soldering/Annealing
- Finishing

additional tools & supplies

- Sandblaster (optional)
- Acetone and a soft cloth
- Heat-resistant polyester tape
- Toaster oven dedicated to non-food use
- Dust mask or respirator
- Safety glasses
- Enamel sifter (optional)

Find out where to buy supplies, *page 79*
See Safety Basics, *page 77*

Cut and file the wire. Use flush cutters to cut four 1½-in. (38 mm) and two 3-in. (76 mm) pieces of 16-gauge (1.3 mm) brass wire **[1]**. Use a flat file to file both ends of each wire smooth and flat **[2]**. Set aside two of the 1½-in. (38 mm) pieces of wire.

Make the rings. Use parallel, flatnose, or chainnose pliers to bend one of the wires into a ring so that the ends meet flush.

TIP: When making a ring, bend the wire into a loose triangular shape with the join in the middle of a flat side **[3]**. You can form it perfectly round after soldering.

Place the wire triangle on a soldering board, apply flux, and place a pallion of hard solder on the join. Heat the whole form evenly, then concentrate the flame near the join until the solder flows. Quench, pickle, rinse, and dry the soldered triangle.

Place the triangle on a ring mandrel, and use a rawhide mallet to form it into a ring **[4]**.

Repeat to solder and form the three remaining wires.

Make the stem wires. Use cross-locking tweezers to pick up one of the two remaining straight wires. Hold the wire perpendicular to your soldering surface, and use your torch to ball up one end of the wire.

TIP: When balling up wire, hold the wire over a pan of water in case the ball gets too heavy and falls off. This instantly cools the rogue metal, minimizing the risk of fire, and keeps it from rolling away.

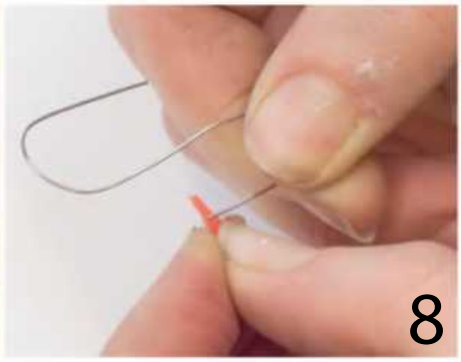
Repeat to ball up one end of the second wire. Quench, pickle, rinse, and dry the wires.

Solder the earring bodies. Arrange a large ring, a small ring, and a stem wire as shown. Apply flux to each join where they touch, and make sure the stem wire is cented on the small ring. Use medium solder to solder the three components together **[5]**. Quench, pickle, rinse, and dry the earring body.

Repeat to lay out and solder the second earring body.

Forge the earring bodies. Set one earring body at a time on a steel bench block and use the flat face of a chasing hammer to flatten the balled-up end of the stem wire **[6]**. This will make the next step much easier.


7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9

NOTE: Forging the rest of the wire is an aesthetic choice. I enjoy varying the line weight.

Attach the ear posts. Apply flux to an earring post's pad and to the flattened ball.

NOTE: For stability and strength, I recommend a prefabricated post with a pad. The powder-coating process will cover the pad, and it will blend seamlessly with the final piece.

Hold the post in a third hand, and center the pad on the flattened ball. Use easy solder to attach the post to the ball.

Quench, pickle, rinse, and dry the earring. Repeat to add a post to the second earring body.

Work-harden the earrings. Work-harden the earrings using any method you prefer. I prefer sandblasting, but if you don't have the equipment, you can hammer them with a rawhide mallet on a steel bench block. This is a vital step to ensure the structural integrity of the earrings.

Prepare the earrings. Preheat a toaster oven (or a regular oven) dedicated to nonfood use to the temperature recommended by the manufacturer of your powder coat. The suggested temperature range is usually 300–400°F (171–204°C).

If you didn't sandblast the surface, use 220-grit sandpaper to lightly sand the earrings, avoiding the posts. This will roughen up the surface, which helps the powder coat adhere.

Mask the posts with a folded strip of heat-resistant polyester tape **[7]**. Leave a tab of tape above the earring, but trim the edge of the tape away from the base of the earring post.

Form two scraps of binding wire into S-shaped hanging hooks. Use a pin or needle to poke a small hole through the tape tab and thread an S-shaped hook through the hole **[8]**.

Use acetone on a soft, clean cloth to remove any residual dirt, oil, or grime from the earrings.

Heat the earrings. Use tweezers to carefully hang the earrings in the preheated toaster oven **[9]**. Make sure they don't touch each other or the sides of the oven. Close the oven door and wait a few minutes for the earrings to warm up.

Prepare the powder. While the earrings are warming, put on your dust mask and gather the colors of powder coat you are going to apply.

NOTE: You can apply a powder coat right from the storage container; this process does not contaminate the unused powder in any way, so there is no need to place a small amount into a secondary container. I store my powders in large plastic food-storage containers.

Use tweezers to lightly stir the powder coat just enough to loosen it up; do not over stir. Because it is a lightweight powder, you should not agitate it too much or it puffs up into dust clouds.

⚠ **SAFETY NOTE:** Always wear a dust mask or respirator and work in a well-ventilated area. You don't want to inhale any of the powder or breathe in the fumes created by the process.

Apply the powder coat. Now for the fun part! When the earrings are warm, use tweezers to carefully remove one from the oven and dip it directly into the container of powder coat **[10]**. This should be a smooth, relatively quick process. Go too fast and you risk injury (minor burns); move too slowly and too much heat will be lost and the powder coat will not adhere to the surface.

NOTE: In this application process, the powder begins to melt when it touches the warmed metal, allowing it to stick.

Lightly tap off the excess powder and return the earring to the oven.

Do not dip the second earring until the oven is back up to temperature. Watch the first earring, and when that one begins to flow out — changes from a dry powder look to a wet-paint look — you'll know that the oven is back up to temperature.

NOTE: Opening and closing the oven door affects the temperature of the second

BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B		Art+
How to file		●	
Soldering	●		
Pickle basics	●	●	
Balling the end of wire	●	●	
Calibrating a toaster oven			Art+

B **Basics, *page 75***
Videos, www.artjewelrymag.com/videos
Art+ **Subscriber video, www.artjewelrymag.com/subvideos**

Process photos by Mariah Davis.

earring just enough to yield inconsistent results. If you try and dip the second earring before it's fully heated, the amount of powder that adheres to it is noticeably less when compared to the first earring.

Repeat the dipping process with the second earring.

You can repeat this process multiple times to build up layers of powder coat. Leave your earrings a solid color, or do a partial dip into a second color. Try using an enamel sifter to apply a second color to create an ombré effect **[11]**.

NOTE: After two layers, the build-up of the powder coat around the posts may make it difficult to remove the tape. If you want to do more than two layers, keep successive coats away from the posts.

No matter what colors you use (or how you combine them), it's important to cure the powder coat according to the manufacturer's instructions. I start timing when the first coat initially flows out.

Allow the earrings to cool either on the oven rack (turn the oven off) or suspended outside of the oven. Don't set the earring down, or you may damage the powder coating while it is hot.

Finish the earrings. Once the earrings are cool to the touch, remove the tape, and file or sand off any powder coat from the posts. If you have a huge mistake, it can often be easier to start over with a new form, since powder coat is incredibly durable and difficult to remove without the use of strong chemicals or fire. Now, show the world your beautiful creation!

See "Powder Coating Explained" (*page 29*) for an overview on using powder coating in your jewelry studio.

See "Supercharge Your Sealant! Powder-coat Your Patina!" (*page 36*) to learn how to protect a patinated finish with powder coating.

ASK THE ARTIST: SAM MITCHELL

You've been given $10,000! What goodies will your studio get?

"If I were given $10,000 to spend on my studio it would get a whole new space! Right now my studio is housed in our spare bedroom; guests have to sleep on the couch. It's my dream to build a small, standalone studio space in our backyard. If there is anything left over (doubtful) I'd throw in a hydraulic press."

Contact: www.aldentedesigns.com

HOT! trending technique

Supercharge Your Sealant! Powder-coat Your Patina!

Trade in messy liquid sealants for a flexible, easy-to-apply industrial-strength alternative.

by Ryan Gardner

Powder coating comes in a variety of colors, textures, and finishes. But, did you know that it also comes in clear? In this article, I'll show you how to use clear powder coat — instead of a liquid sealant, like a lacquer — to protect the surface of a piece of jewelry patinated with liver of sulfur. The benefit to using an electrostatic system for powder coating as opposed to a heat-and-dip technique is spraying ensures a smooth, even, and thin application of the powder. The same system I demonstrate can also be used to apply opaque and transparent colors.

The system

The powder-coating system I prefer is the Craftsman Powder Coating System (see "Powder Coating Explained," *page 29*). It doesn't require an air compressor, is the most affordable of the ones I've looked into, and is the simplest to use.

NOTE: Unfortunately, this all-in-one system is no longer sold by Sears or on Amazon, but you can still find some for sale on eBay or through racing-supply companies, such as Summit Racing. See "Editor's Note: Alternative Powder-coating System," *opposite page*, for how to use a more commonly available system with an air compressor.

The power supply that comes with the system has two wires: One is the power source for the gun, and the other is a ground wire terminated with an alligator clip that you'll attach to the hanging system/object you are going to powder coat. This will ground your piece so that the charged powder will be attracted to your piece and stick to it.

The powder-coating gun includes a detachable clear cylinder into which you place the powder you want to use.

NOTE: If you plan to use multiple colors, clean out the cylinder thoroughly between colors; the powders don't mix very well, and you may contaminate the powder.

The powder

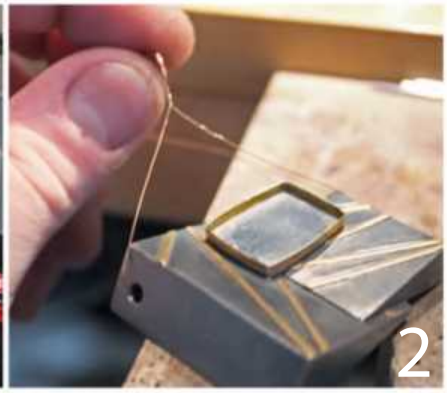
Many companies make powder for powder coating, and I have come nowhere near trying them all. You can find many sources with a quick search online. The good thing is that the powder is inexpensive, making it easy to try a variety of powders and see which one you like best.

For a clear coat, I prefer the powder made by Columbia Coatings. They have clear powders in matte, semi-gloss, and high-gloss. I usually use semi-gloss; I feel it affects the metal's finish the least of the three. For example, if you have a high-polish finish on your metal and then use the matte clear coat, you'll lose the high-shine look. In the process photos, I am using the clear coat to protect a pendant made of 22k gold and silver that I patinated with liver of sulfur. (I haven't tested it, but this should work to seal patinas that can withstand the temperatures required to cure the powder.)

⚠ **SAFETY NOTE:** Always wear a dust mask or respirator and work in a well-ventilated area. You don't want to inhale any of the powder or breathe in the fumes created by the process (the application process can get messy).

Left: Ryan Gardner patinated his sterling silver, 22k gold, and rutilated quartz pendant with liver of sulfur. He applied a clear powder coat to preserve the patina.


1


2

The booth

Assemble a spray booth. It's easy to make your own spray booth. Turn a plastic tub on its side, and drill a hole centered in one long side of the container (this is where you'll insert a copper hanging system from which you'll suspend your piece of jewelry).

NOTE: As long as you keep the booth clean and free of contaminants between uses, you can collect and reuse the powder that does not adhere to the piece.

Make a hanging system. You need a way to suspend your piece inside the booth: It must have a vertical element that can be inserted through the hole in your booth (the alligator clip will attach to this and hold it in place), a horizontal element from which you'll hang your piece, and it must conduct electricity. I used a strip of copper and scrap wire (any metal will work) to make a T-shaped hanging system that could be used for multiple pieces **[1]**. You can see the edge of the alligator clip (red) attached to my hanging system at the top.

NOTE: Another option is to drill a hole in each side of the tub and insert a copper tube or rod through the holes. You would attach the alligator clip to the rod extending from one side of the tub.

Use thin-gauge copper wire to create a hanging wire or hook from which to hang the piece inside the booth **[2]**. This wire can go through a bail or attach through a pierced opening. The wire needs to touch the piece in order to ground it, but should make as little contact as possible, or the wire may get stuck in the powder when it's cured.

The application

Fill the gun with powder. Move the tab on the side of the gun to the unlocked position. Slide out the clear cylinder. Remove the cylinder's lid, and fill it about halfway with powder. Replace the lid, place the cylinder into the gun, and lock the tab.

Clean the metal. Use soapy water to clean your metal, and dry it. Then, wipe it with a lint-free cloth dipped in acetone to make sure there isn't any oil from your hands on it. The key is to get your metal absolutely clean, because anything on the surface of the metal — such as dust, hair, or fuzz — will be there permanently once the powder is cured.

Apply a resist. If there's a place on your piece where you don't want powder, use masking tape to mask it off before applying the powder. You'll remove the tape before putting the piece in the oven to cure: otherwise, the powder will cure over the tape, trapping it on the piece.

Apply the powder coat. Put on a respirator or turn on your ventilation

Watch jewelry maker Michael Dale Bernard demonstrate how to powder coat with a system that requires an air compressor at **www.artjewelrymag.com/videos**.

materials

- Metal object/jewelry
- Powder coat, clear
- Scrap copper wire and sheet

tools & supplies

- Dust mask or respirator
- Plastic tub
- Drill with drill bit large enough for your hanging system
- Soapy water
- Lint-free cloth
- Acetone
- Masking tape (optional)
- Small paintbrush (optional)
- Convection or toaster oven (dedicated for nonfood use)

Find out where to buy supplies, *page 79*
See Safety Basics, *page 77*

VIDEO

Learn fundamental techniques in this bonus tutorial:

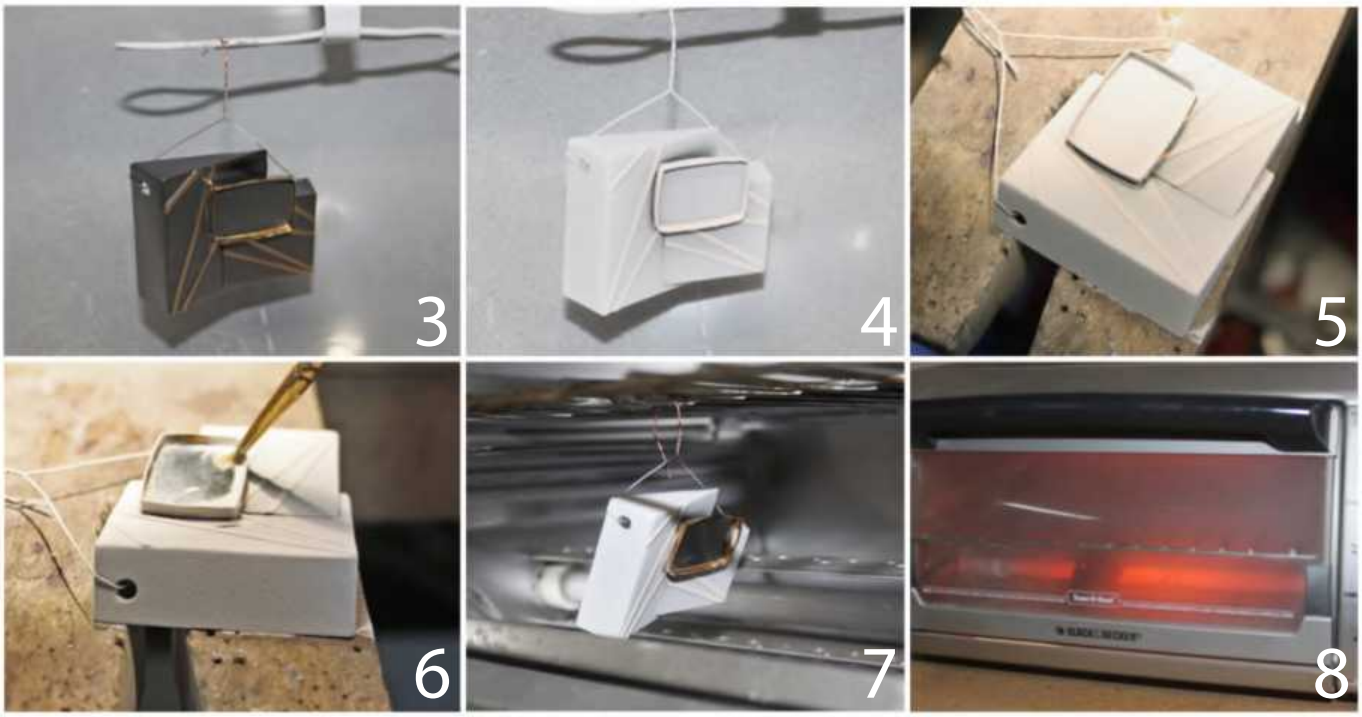
Calibrating a toaster oven

Subscriber video, www.artjewelrymag.com/subvideos

editor's note: alternative powder-coating system

If you can't find the Craftsman Powder Coating System, you can use a readily available system that requires an air compressor. This type essentially works the same way as the system Gardner uses but the parts are a little different.

Unlike the all-in-one powder-coating system, where pulling the trigger completes the circuit, systems with an air compressor have a handheld or foot-powered activation switch. Depress the switch to ground the piece while spraying the powder, and release it when you need to adjust your piece. The powder container attaches directly to the gun. Follow your manufacturer's instructions to use your powder-coating system. *—AP*



Process photos by Ryan Gardner.

system (this process gets messy). Suspend your piece from the hanging system **[3]**. Hold the gun about 6–8 in. (15.2–20.3 cm) from your piece. Press the trigger on the gun, and apply the powder from multiple angles to create an even coat **[4]**. You need only one layer, but you can control the thickness of the coating by applying more or less powder.

NOTE: The easiest way to cover all sides of a piece is to spray the front, release the trigger, then turn the piece around to cover the back. If it's too difficult to reach all areas at once, coat the front and back in two steps, curing in between them.

Remove excess powder. Gently remove the piece from the spray booth (leave the hanging wire attached) **[5]**. Use a small, dry paintbrush to remove powder from areas you don't want coated **[6]**, including the top part of the hook. (A damp paintbrush will cause the powder to clump up.) If you used tape as a resist, carefully remove it now.

NOTE: Remove the powder from the inside and outside of any bezels. Powder that falls onto the the piece from the outside of the bezel won't affect the surface, but leaving a layer of powder inside will affect the fit of the stone when you set it.

Cure the powder. Calibrate your convection or toaster oven (dedicated to nonfood use), and preheat it to your powder manufacturer's recommended temperature (usually 300–400°F/149–204°C).

Use tweezers to hang your piece inside the oven. If it's small enough, you can hang it from the metal tray inside your oven **[7]**. If your piece it too large for that, build a wire support from which you can hang it.

Close the oven. Cure the powder at your powder manufacturer's recommended time and temperature (mine cures at about 350°F/177°C for 15–20 minutes) **[8]**. Start timing after flow out — when you see the powder gloss over.

Remove your item from the oven, and hang it to cool. When it is completely cool, remove the copper hook, and finish your piece as desired.

NOTE: If the wire gets stuck in the powder coat, it will leave a mark when you pull it out (if you even *can* pull it out). If the glitch is small enough, lightly sand it out. Most of the time however, it is big enough that the sanded portion would be obvious; if that is the case, I recommend removing the cured coating (see "Powder Coating Explained" *page 29*), using a smaller hanging wire, and starting over.

ASK THE ARTIST: RYAN GARDNER

You've been given $10,000! What goodies will your studio get?

"I think I would first get a bigger bench! Then, I would get casting equipment — I've been wanting that for a while. If there was anything left I'd get a big slab saw!"

Contact: www.ryangardnerdesigns.com, ryangardnerdesigns@gmail.com

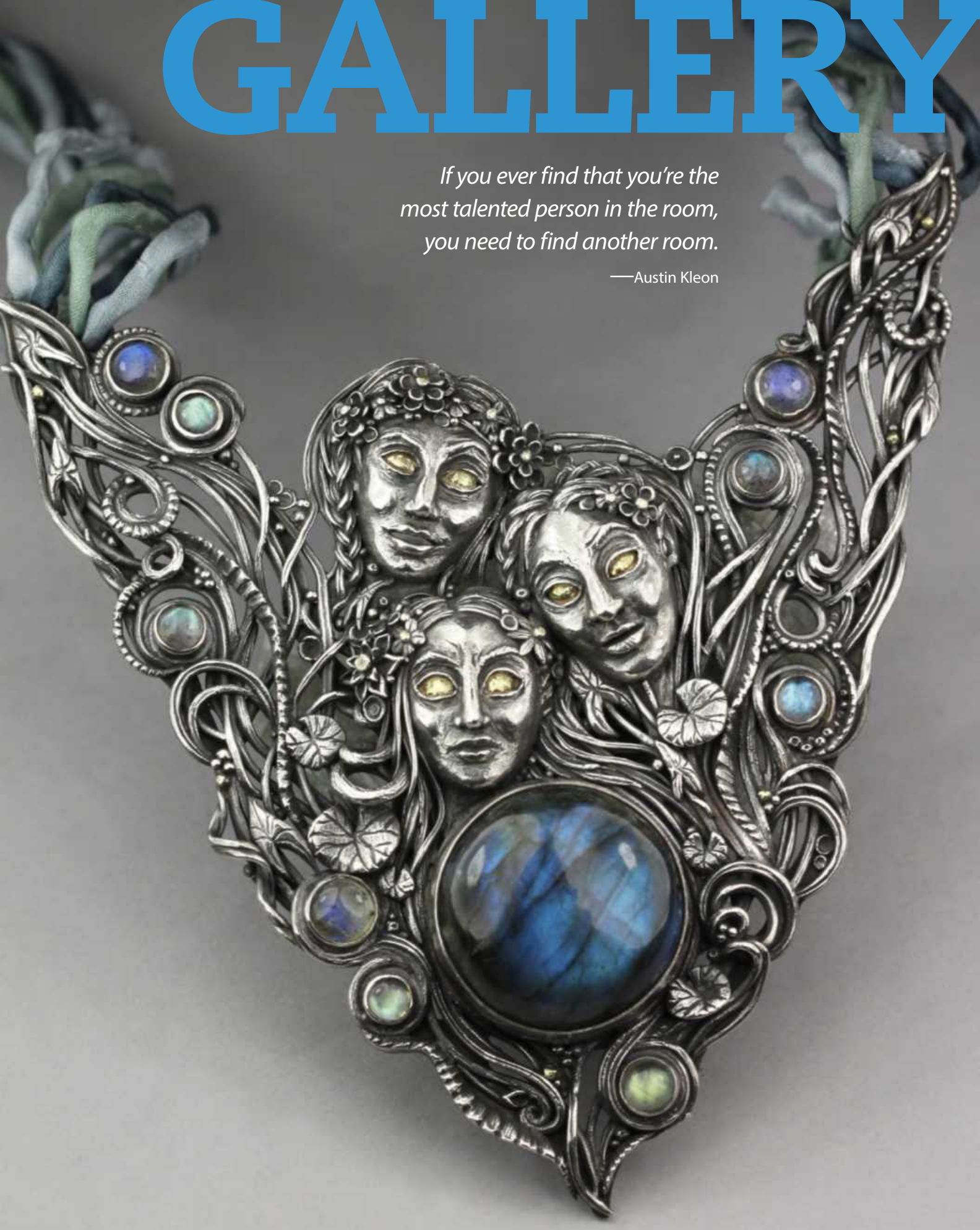
Learn all about powder coating in "Powder Coating Explained," *page 29*.

See "Make Powder-coated Ombré Earrings," *page 32*, to learn how to make a pair of earrings using a different powder-application process.

GALLERY

If you ever find that you're the most talented person in the room, you need to find another room.

—Austin Kleon



[page 39] Anna Mazoń's necklace, *Midsummer Night*, celebrates Slavic midsummer festivals, when young women throw wreaths into rivers or lakes to tell the future. However, there is danger, as *rusalkas* (water spirits) mesmerize handsome men and lure them to a watery death. Mazoń depicts these sirens in fine-silver and 18k-gold metal clay, with labradorites to evoke the water. 8.0 cm (roughly 3⅛ in.) wide.
Photo courtesy of the artist.

[A] Sarah C. Chapman created her *Compass Necklace* as an instrument of imagination to help guide the wearer. In the center of the piece, a freshwater pearl floats freely behind a quartz watch crystal, standing in for a compass needle. In the body of the pendant, heavily oxidized sterling silver is touched by a gleam of 22k gold. 2 x 1¼ x ½ in. (51 x 32 x 13 mm)
Photo by Larry Sanders.

[B] It was the stone — a stunning Mexican fire opal — that inspired this *Emerald-cut Fire Opal Corset Ring* from the **Rebecca Myers Collection**. The opal is framed in 18k gold, the shank is made of oxidized silver, and two columns of diamonds give it, in Myers' own words, "that extra layer of glam."
Photo by Ralph Gabriner.

B

[C] For her *Progressive Coral Bracelet*, **Janine DeCresenzo** took coral, found years ago by her grandmother, and set it in sterling silver with green amethyst, rubies, citrine, and diamonds. "I've always been inspired by aquatic life and feel more relaxed and myself near the water," says DeCresenzo. By using the old coral in jewelry, she pays tribute to the sea, and gives it a new life. Photo by Peter Groesbeck.

C

***To contact the featured artists, see Contacts,* page 79.**

[D] The dramatic contrast of color and prestige is what fascinates **Robert Grey Kaylor** when creating the pieces in his REALSTEEL collection. The rugged, raw look of antique steel square-head nails pairs with the tailored finish of 18k gold and pavé diamonds; far from being jarring, the striking contrast strikes a balance instead. ½ in. (13 mm) wide. Photo by Ralph Gabriner.

[E] Nan Blair uses her jewelry to recapture the time she spends exploring the dramatic canyons of the American southwest and hiking in the Rocky Mountains. This pin, of sterling silver, 18k gold, and pyrite on schist is a perfect example of Blair's approach of layering stone and a mixture of metals to re-create the wild, raw imagery of her outdoor adventures. 1¾ x 1¾ in. (44 x 44 mm). Photo by Ralph Gabriner.

[F] From her childhood in Minnesota, **Susan Elnora** remembers rainy days when masses of frogs would venture inland from the nearby lakes and rivers. As wildlife of all kinds deplete, those days are past; seeing that the frogs of her childhood memories have vanished inspired Elnora's *Frog Skeleton and Lilypad Necklace*, of sterling silver and 18k gold. The frog is roughly 2½ in. (64 mm) long. Photo courtesy of the artist.

D

E

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want more inspiration? You can see these and over 450 other pieces that have been featured in our Gallery at **www.artjewelrymag.com/gallery**.

F

***To contact the featured artists, see Contacts,* page 79.**

SOLDERING HIDDEN JOINS

Use hidden crossbars to create a pendant with the illusion of a floating central element.

by Jeff Fulkerson

Blind soldering is a great technique that can set your jewelry apart from the crowd. No, you don't solder blindfolded (someone had to say it). Blind soldering is when you can't see your solder join. To be successful at blind soldering, you have to watch your metal as you heat it, paying attention to the shifting colors so you will know when it gets hot enough for the solder to flow. It sounds tricky, but with a little practice, you can add this technique to your metalsmithing arsenal.

materials

All material amounts determined by design.

- Cabochon
- Sterling silver sheet:
  - 18-gauge (1.0 mm), 3/16 in. (5 mm) wide, (for outer wall)
  - 20-gauge (0.8 mm), (for backplate)
  - 22-gauge (0.6 mm), copper (for center assembly)
- Sterling silver wire:
  - 16-gauge (1.3 mm), round, 1 in. (25.5 mm)
  - 14-gauge (1.6 mm), square, 2 in. (51 mm)
- Fine-silver bezel wire: 1/8-in. (3 mm),
- Sterling silver tubing: 3/8-in. (9.5 mm) outside diameter (OD), 1/2 in. (13 mm)
- Sterling or fine-silver scrap

toolboxes, *page 77*

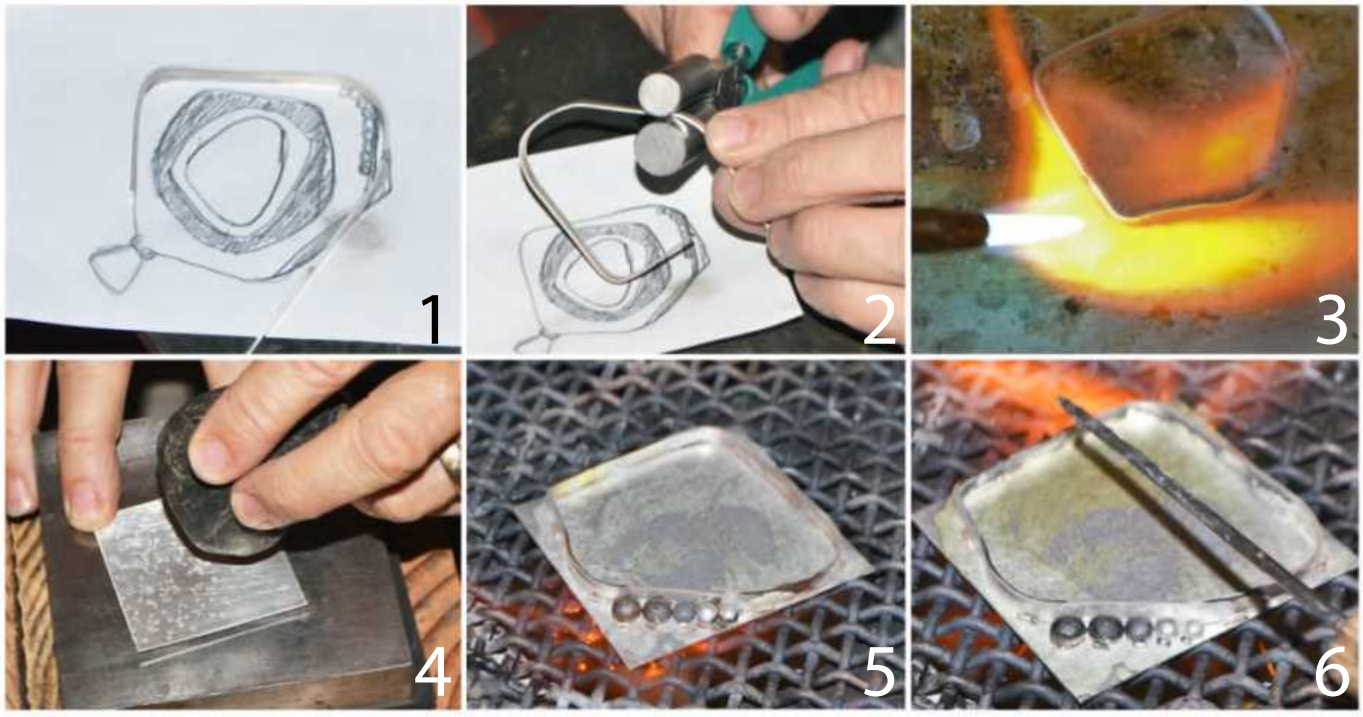
- Sawing/Piercing
- Soldering/Annealing
- Finishing

additional tools & supplies

- Mandrel pliers (optional)
- Metal texturing tools: Ball-peen hammer, brass pattern sheets and rolling mill, or others (optional)

Find out where to buy supplies, *page 79*
See Safety Basics, *page 77*

FREE for a limited time! Through February 2, 2016, download "Don't Settle for a Plain Bezel" (March 2015) by Jeff Fulkerson, to learn how to personalize your bezel settings. **www.artjewelrymag.com/projects**



BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B		
Basic sawing of metal	●		Art+
How to file		●	
Annealing metal	●	●	
Pickle basics	●	●	
Sanding	●		
Making balls with fine-silver scrap metal			Art+
Sweat soldering	●	●	
Preparing and using a charcoal block		●	
Liver of sulfur	●	●	Art+
Setting a cabochon in a bezel, Parts 1–3		●	

B **Basics,** ***page 75***

Videos, www.artjewelrymag.com/videos

Art+ **Subscriber videos, www.artjewelrymag.com/subvideos**

Sketch your design. Your stone will dictate the size and design of your pendant. Trace the outline of your cabochon onto a piece of paper, and then sketch your design at fullscale.

My pendant is 2 x 2½ in. (51 x 64 mm) and consists of three layers of metal sheet. The cab sits within a bezel on top of two layers of metal; those two layers of metal are raised, giving them the illusion of floating above the backplate **[Figure,** *page 49*]. The backplate itself has a thick, 18-gauge (1.0 mm) outer wall, which I embellished with graduated silver balls. The instructions that follow will correspond to my pendant; adjust the instructions as needed to complete your design.

Make the outer wall. Measure the perimeter of your pendant's backplate (the layer that will rest on the wearer's skin). The perimeter of my backplate measures almost 8 in. (20.3 cm) long. My 18-gauge (1.0 mm) sterling silver sheet was only 6 in. (15.2) long, so in order to make the outer wall, I cut two 3⁄16-in. (5 mm)-wide strips of silver and spliced them together with a butt join (see "Making a Butt Join," *opposite page*) to make a strip that was long enough for my design.

Anneal the full length of the strip to make forming it easier. Quench, pickle, rinse, and dry your metal.

Using your sketch as a template, form the strip to match the edge of the backplate **[1]**. You can use your hands, pliers, or an anvil horn for this. I like to use mandrel pliers **[2]** because they let me make straight bends and keep my metal from twisting; this makes soldering much easier.

Once you have formed your strip, file the ends flush and solder the join with hard solder **[3]**. Quench, pickle, rinse, and dry the outer wall.

Make the bezel. Wrap your bezel wire snugly around your cab. Use an awl or fine-tip permanent marker to mark where the bezel wire overlaps. Use flush cutters to cut the wire at the mark. File the two ends straight and smooth.

TIP: Silver solder won't fill a gap. The better you prepare your join, the easier it will be to solder completely on the first try, and the cleaner your finished join will be.

Solder the join with hard solder. Pickle, rinse, and dry the bezel. Set it aside.

Texture the metal for the backplate. Add texture to one side of a piece of 20-gauge (0.8 mm) sterling silver sheet that is slightly larger than the outer wall of your design. Use whatever texturing

making a butt join

Sometimes you need a longer strip of metal than what you have on hand. A quick solution is to connect two pieces end-to-end with a butt join. It takes a little more effort than having a long strip at the ready, but a great side effect of this process is that it also anneals the metal, making it easier to form.

Use a flat file to file the end of one metal strip to a 90° angle. Repeat to file a 90° angle on the second strip. Align the two filed ends and verify they butt up flush, with no gaps. Use hard solder to solder the join. Quench, pickle, rinse, and dry the strip.

NOTE: Keep in mind that the join will be a little stiffer and more difficult to form than the rest of the strip.

method you prefer — hammering, roll-printing, or brushing. I use my magic texturing tool: a rock (while wearing eye protection) **[4]**. For your design, it may not be necessary to texture the whole sheet, just what will show on the finished piece.

Make the embellishments. My design also incorporates five graduated balls of silver. To form these balls, use scrap pieces of fine or sterling silver; it's a great way to reclaim and recycle material. Place a small amount of scrap silver on a smooth part of a charcoal block. Use a bushy flame to heat the silver. As it melts, the silver will automatically draw up into a ball. Allow it to cool, then pickle, rinse, and dry it. Make multiple balls of various sizes.

TIP: When pickling small components, it can be difficult to retrieve them from the pickle. A slotted plastic container, like the ones used for fruit and vegetables, makes a great solution. Set the container in the pickle pot to catch the components. When they are clean, you can retrieve them by lifting out the container.

Make the backplate. Set the backplate texture-side down on a tripod screen. Apply flux to the backplate, and set the outer wall and the silver balls in place. Place pallions of medium solder along the outside of the outer wall and at each silver ball.

Heat the entire piece with a torch. Alternate from above and below the assembly, then direct the heat around the inside of the outer wall until the solder flows **[5]**.

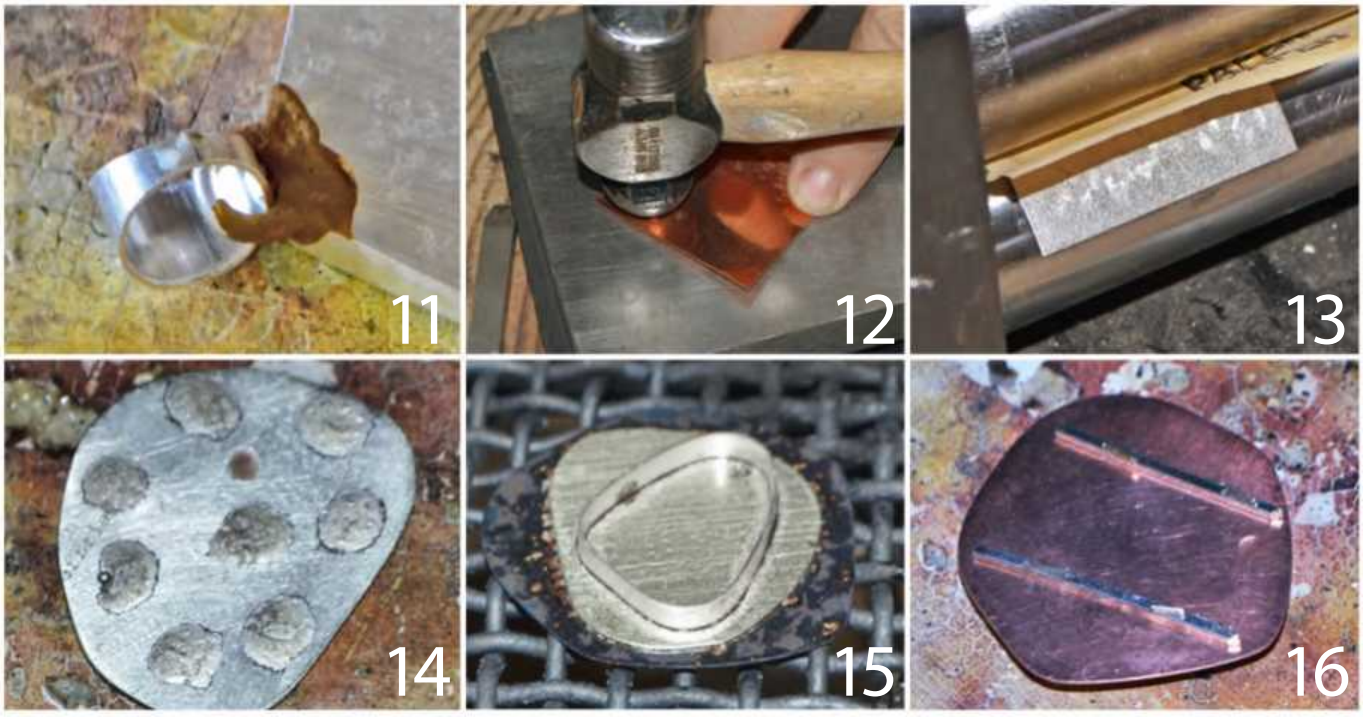
TIP: When you heat a large piece of metal, the sheet may warp. Use a soldering pick to gently push the pieces together to ensure a good solder join **[6]**.

Quench, pickle, rinse, and dry the backplate. Check the joins of the silver balls and the outer wall against the backplate.

Use a jeweler's saw with a #2/0 blade to trim the excess metal sheet from around the outer wall **[7]**. Cut close to the outer wall, but not so close that you risk cutting into the wall. You can file the backplate to even out the edge later.

Cut and attach the bail. Cut a small section of ⅜-in. (9.5 mm) outside-diameter (OD) sterling silver tubing to be your bail **[8]**. Cut each end on a slight angle, creating a V-shaped tube.

Use flush cutters to cut a roughly 1-in. (25.5 mm) section of round 16-gauge (1.3 mm) sterling silver wire. Bend the wire into a U with the legs roughly ⅛ in. (3 mm) apart. File the wire ends at an angle that matches the contour of the outer wall **[9]**. Apply flux and use easy solder to attach the U-shaped wire to the wall **[10]**. Quench, pickle, rinse, and dry the assembly.



NOTE: Depending on the angles of your U-shaped wire and V-shaped tube, it may be possible to string the tube on the wire before soldering it to the outer wall, allowing you to skip the next few steps.

Use the jeweler's saw to cut the V-shaped tube along the narrow end of the V. Open it just enough to slide it over the U-bend, and close it. Apply anti-flux to the joins of the U-shaped wire and the outer wall, and then solder the V-shaped tubing closed with easy solder **[11]**.

Quench the assembly in water, and use a toothbrush to clean off the anti-flux to prevent contaminating the pickle. Then pickle, rinse, and dry the assembly.

Texture and cut the central assembly. The central assembly is composed of two sheets of metal — I used 22-gauge (0.6 mm) copper and sterling silver — and a bezel-set cab. I used a ball-peen hammer to texture the copper sheet **[12]**, and ran the silver through a rolling mill with a brass pattern sheet **[13]**. (You can texture your metal any way you like.) Use the jeweler's saw to cut out the two metal pieces to match your sketch. Use files and bobbing compound on a muslin buffing wheel to remove any burrs and refine the edges of both pieces of metal.

Solder the central assembly. Place the silver sheet texture-side down on your soldering board. Apply flux to the back of the sheet. Heat the metal until the flux becomes a white crust. Place pallions of medium solder on the silver and heat the metal until the solder flows — this is called sweating (see "Tinning vs. Sweating," *below left*) **[14]**.

Set the copper texture-side up on the tripod. Let the silver cool slightly, then reapply the flux and place the silver solder-side down on the copper. Set the bezel in place on top of the silver. Apply flux to the bezel and place pallions of medium solder inside the bezel. Heat the assembly from above and below until the solder flows and connects all three components **[15]**. Pickle, rinse, and dry the central assembly.

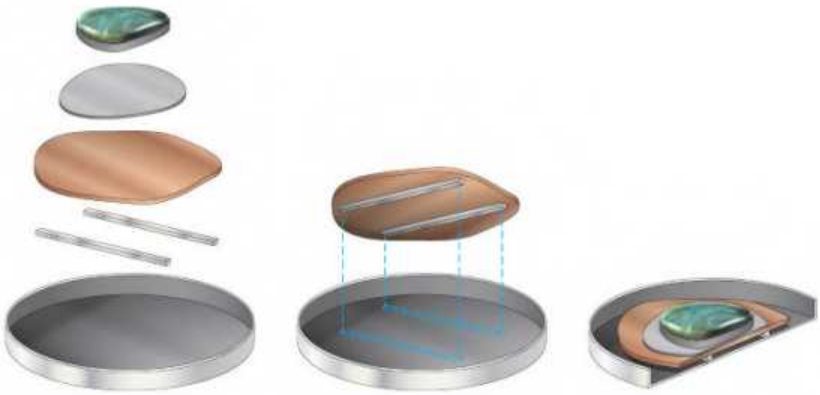
NOTE: I find that a plain bezel can be boring. If you want to personalize your bezel, now's a good time to do it. I used a cut-off wheel in a flex shaft to cut regularly spaced notches in my bezel.

Blind-solder the central assembly to the backplate. The secret to making the central assembly seem to float is two hidden crossbars. Cut two pieces of 14-gauge (1.6 mm) square sterling silver wire that are slightly shorter than the width of the copper layer. Set the central assembly bezel-size down on your firebrick. Apply flux to the back of the assembly and set

editor's note: tinning vs. sweating

Tinning comes from the rust-prevention process (once widely used) of lightly coating steel with molten tin. It is also used to coat the inside of copper pots as a barrier to acidic food reacting with the copper and as a nonstick coating (now most pots are steel lined, but it's still done). The term is also used to describe coating metal or the tip of a soldering iron with soft solder. Both tinning and sweating are often used interchangeably to describe the soldering process used by plumbers to connect pipes and fittings (soft solder).

Now, here's where it gets confusing. Tinning is also sometimes used to describe what Fulkerson describes, flowing silver solder onto a piece for sweat soldering — which is also called sweating. —*AP*



Figure

the crossbar wires in place. Set pallions of easy solder alongside and on top of each crossbar wire **[16]**. Use a bushy flame to solder the wires to the central assembly. As you heat the wires, the solder on top of the wires will flow, sweating the wire. Pickle, rinse, and dry the assembly.

Apply a generous amount of flux to the backplate and the back of the central assembly. Set the backplate on the tripod. Set the central assembly on the backplate, and heat it with the torch, alternating between above and below. Evenly heat the central assembly and the backplate until the solder flows.

NOTE: Because the joins are hidden from view, you won't be able to watch for the customary silver flash to see when the solder flows — you'll have to watch for other cues. Carefully watch the color of the metal **[17]**. When it glows a dull red, the easy solder should have flowed. You may also notice the floating layer drop slightly when the solder flows.

Pickle, rinse, and dry the pendant.

Check your joins. Check your blind solder joins by gently trying to lift each side of the central assembly. If it's soldered, you won't be able to budge it.

Another way to check your joins is to tap the pendant on a steel bench block. It should sound solid. If there is a "ping" or a "clank," one side is probably not soldered. Double-check by trying to pry up the floating layer. If it moves at all, set the assembly back on the tripod, brush flux under the join as best as you can, and heat until the solder reflows.

TIP: When soldering, make sure you've pickled your piece long enough to dissolve any flux. Hardened flux can trick you into thinking a join is complete.

Once both crossbars are secure, use a file and sandpaper to refine the outside edges of the pendant.

Finish the pendant. Finish the piece as you prefer. I used a liver-of-sulfur solution **[18]**, sanded the high spots with 320-grit sandpaper to highlight the texture, and followed up with a brass brush and soapy water to give the metal a nice sheen.

Finally, set your cab in the bezel. AJ

Process photos by Jeff Fulkerson.

ASK THE ARTIST: JEFF FULKERSON

You've been given $10,000! What goodies will your studio get?

"If I was given $10,000 to use on jewelry 'stuff,' I'd get a Smith Little Torch rig, a new casting set-up, a steam cleaning machine, and last but not least, *more room!*"

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PROJECT
INTERMEDIATE/ADVANCED | METAL

CLASSIC HOLLOW FORM

How to Make a Spiculum

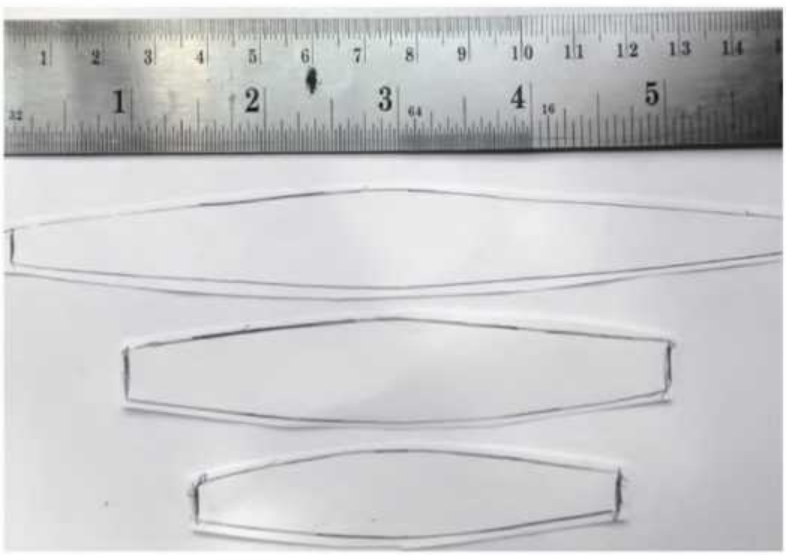
Form, solder, and planish to transform a flat template into a graceful, tapered tube.

by Michael David Sturlin

A spiculum, as known by metalsmiths, is a tapered hollow form made from sheet metal. The origins of the word reference a small, sharp point, such as an arrow. The spiculum form has many applications in metalsmithing, not limited to jewelry. Tapered shapes are employed as spouts for coffeepots and teapots, the body and cap of a fountain pen, a candelabra, handles for serving ware, a hairpin, dreidel, and countless other functional objects.

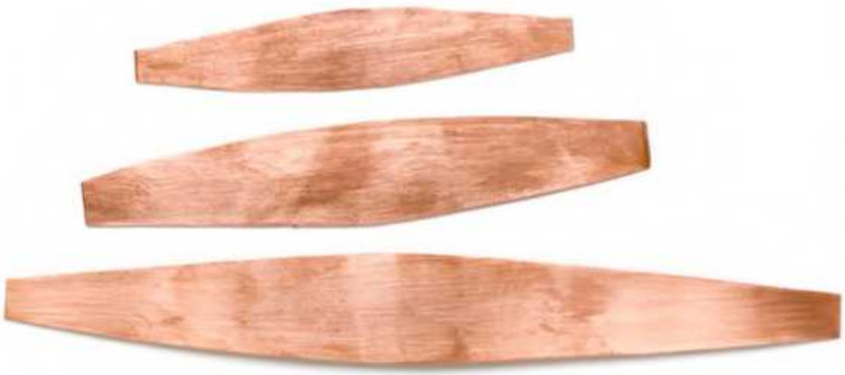
Forming a piece of flat metal into a hollow form offers practice in several metalsmithing skills: layout, sinking, raising, soldering, and planishing, but it isn't a beginner project. It's a suitable challenge for those who are familiar and confident with a variety of metalsmithing skills and and who posess knowledge of safety procedures.

PREPARING THE BLANK



1 Use an abrasive pad to clean the metal. Then, draw a template on paper to the size you desire. (The blank will not lose length when formed; the template fairly represents the finished length of the spiculum.) Cut out the template, and use a fine-tip permanent marker to trace it onto the metal.

Use shears to cut out the blank. Use a hand file of your choice to remove any burrs and refine the edges. Anneal the blank before forming it. You can quench the blank in water and dry it, but do not use pickle at any point in this project. (See the safety note in "Soldering Strategies," *page 54*.)



materials

- Metal sheet (copper or fine silver), 24–20-gauge (0.5–0.8 mm), amount determined by design

toolboxes, *page 77*

- Soldering/Annealing
- Sawing/Piercing
- Hammering

additional tools & supplies

- Wood forming/swage block
- Blunt tool (such as a dull bench knife, a sturdy letter opener, a sturdy plastic handle of a toothbrush, etc.)

Find out where to buy supplies, *page 79*
See Safety Basics, *page 77*

BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B		
Using shears to cut metal			Art+
How to file		●	
Annealing metal	●	●	
How to use ball-peen and cross-peen hammers			Art+
Soldering	●		
Stick soldering		●	
Pick soldering		●	

B Basics, *page 75*
Videos, www.artjewelrymag.com/videos
Art+ Subscriber videos, www.artjewelrymag.com/subvideos

Art+ Subscribers! Download a FREE PDF of the full-size spiculum templates at **www.artjewelrymag.com/templates**.

FORMING

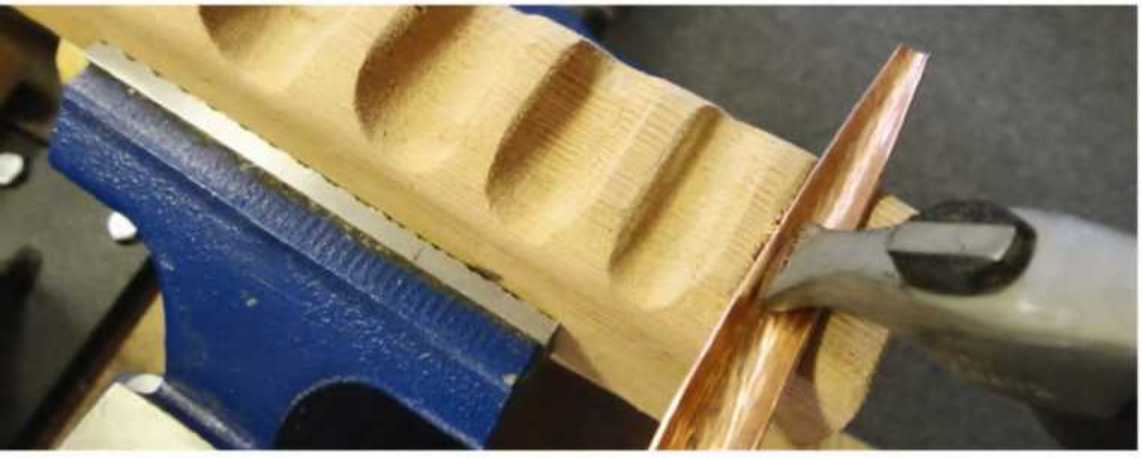
2 Secure a wooden forming block horizontally in a bench vise. Position yourself so that the grooves in the block are parallel to your body. Place the metal blank in a wide groove in the block. Angle the metal so that the edges of the blank touch the sides of the groove but there is air space between the metal and the bottom of the groove.

3 Starting at the widest part of the blank, use the wedge-shaped peen of a goldsmith's hammer to strike the metal just inside the edge closest to you. Repeat to strike along the edge with overlapping, lengthwise blows. Keep the blank parallel to the groove as you work. This will begin to form a curve along the edge of the metal inward, toward the center. The curve along the length of the edge should be smooth and even.

NOTE: Depending on the size of your blank, you may need to use different grooves of varying sizes for each course of forming.

4 Rotate the blank 180° in the groove, and work the opposite side in the same way. Keep the edges as parallel as possible.

5 Move the blank to the next-smaller groove in the forming block, and continue forming the blank. Strike just inside where you made your previous pass with the hammer. Forming each edge toward the center of the blank furrows the metal into a U-shape. As the metal curves upward, move it to smaller grooves in the block.



6 As the curve develops and tightens, keep the edges of the metal blank straight and parallel by using the edges of the groove in the block; aim your hammer strikes against the walls of the groove rather than the floor.

There are good forming and swage blocks on the market, but there are advantages to making your own. Check out "Make Your Own Forming Block!" on *page 24*.

7 Once the metal is slightly over half-way formed, close the form from the outside. The shape of the form becomes self-supporting as the walls curve inward and come together.

Hold the metal in the block, on your bench top, or on a steel bench block. Use gentle blows with the domed face of the goldsmith's hammer to begin to curve the metal around, closing up the blank into a hollow form. Rotate the blank as needed, and work slowly and evenly to create a smooth form.

8 Continue to align the seam and bring the edges together until they meet flush.

NOTE: If one edge overlaps or collapses, use a blunt tool, such as a dull bench knife, a sturdy letter opener, or a sturdy plastic handle of a toothbrush to reopen the seam. What's important is that the tool is strong enough to apply needed leverage, and doesn't have a sharp edge. Make sure both the metal and the tool are well-braced on the bench pin. Hammer again to realign the edges and close the seam.

If the metal is springy and you find it difficult to align the join, anneal the metal and close the seam again.

the thick or thin of it

The choice of metal gauge for hollow forms varies: it depends on the type of metal being used, the purpose of the object, and the desired type of finish. Size and weight are other determining factors, as is the final surface finish. The most common gauges for forming spicula are 24–20 gauge (0.5–0.8 mm).

If the spiculum will have planishing marks as the final finish, or if it will be filed, sanded, and highly polished, extra thickness is beneficial.

Pros & Cons:

Thin sheet

Thinner sheet is initially easier to shape and form. It is quick and efficient to sink into a groove, but you need to take greater care when closing the seam from the outside. Thinner metal is also more likely to dent as you planish the soldered form.

Thick sheet

Thicker metal requires slightly more effort to form, which also makes the process more controllable and allows more confident use of the hammer and block. Aligning the seam, soldering, filing, and finishing are also easier with thicker metal.

Thick *and* thin sheet

For longer or larger spicula, it's common practice to reduce the thickness at the narrow ends of the sheet. This facilitates bending the pointed tips into small circles as the form is closed up. Step-roll the last 15–20 mm (roughly 5/8–3/4 in.) on each end of the blank to thin the ends. Then, anneal the blank before forming it.

soldering strategies

Soldering larger forms is often done by **stick soldering**. This method uses a length of wire solder (held in the hand or gripped in cross-locking tweezers) that is brought into contact with the metal under the heat of the torch flame. As the fluxed piece is brought up to temperature, the end of the wire solder is touched against the hot metal and flows into the join.

Stick soldering takes practice to perfect, and is useful for certain situations. One disadvantage of stick soldering is that more solder than intended can easily run onto the object. This means additional filing and clean up.

Pallion and **pick soldering** are two other options for soldering the join. Both involve placing solder along the fluxed join. In one, pallions are placed before heating; in the other, melted spheres are placed with a soldering pick while the metal is heated. In either case, you'll use a pick to move and position the solder as the object heats up. And in both cases, there will be small excesses of solder on top of the join to be filed away afterward.

An alternate method of pallion soldering is **tension soldering** — placing the solder directly in the fluxed join, rather than on top of it. Roll or forge a strip of solder as thin as possible. Cut long strips of thinned solder instead of pallions. Use tweezers or pliers to slide the strips into the join, suspending them in place. As the spiculum is heated, the solder will flow within the join. This is the best method to control the amount and flow of the solder, but is more time consuming to set up.

⚠ **SAFETY NOTE:** Don't pickle the spiculum! Pickling hollow forms presents a significant safety concern. Small openings make it easy for liquids to get in and hard to escape, making it difficult to rinse and neutralize pickle once it's inside the form. If the metal is oxidized or discolored after annealing, clean it with an abrasive pad. If there is flux on the outside of the form after soldering, soak or simmer it in clean, hot water until the flux dissolves.

SOLDERING

9 Once the join is flush, it's time to solder it closed. A round cylindrical form, like a spiculum, has a tendency to roll. Stabilizing it with a prop or a third hand will keep it from rolling during soldering — just make sure not to put pressure on the spiculum, which might cause it to collapse when heated. I file grooves in a piece of Solderite board to cradle the rounded forms without pressure.

10 Apply flux to the join, and use hard solder to close it. (See "Soldering Strategies," *left*.) Quench it or let it air-cool. If you quench the form in water, be sure to submerge it horizontally, with the openings pointing away from you; scalding-hot water or steam might escape if it is submerged vertically.

Use a file of your choice to remove any excess solder. If necessary, place the spiculum in the forming block and use the goldsmith's hammer to correct its exterior shape.

ASK THE ARTIST: MICHAEL DAVID STURLIN

You've been given $10,000! What goodies will your studio get?

"I would redirect most of it to educational programs for those who have few tools or opportunities. I would donate the funds to Made by Survivors, The Tool Box Initiative, and Revere Academy scholarships. I can't think of a single tool I would buy for my own studio, but I might use a small amount of the money — say, 10% — to purchase metal."

Contact: michaelsturlinstudio@cox.net

PLANISHING

Process photos by Michael Sturlin Studio.

11 Set the spiculum on the bench block, and use the domed face of the goldsmith's hammer to cover its entire surface with overlapping hammer blows. Planishing work-hardens the form and is the final refinement to the outer shape. (See "Planishing Pointers," *right*.)

12 For additional texture, use the wedge or ball end of a ball-peen hammer to planish the spiculum and create distinctive hammer marks. These marks can be the final finish for a truly hand-wrought surface.

planishing pointers

Planishing has no shortcuts. It is a process of systematically covering the entire surface of a piece of metal with precise hammer blows. It takes time to do it properly, and focus to do it well.

Planishing is also good developmental activity for dexterity and hand/eye coordination. You'll strike every square millimeter of the surface one or more times; even a small form will likely require thousands of hammer blows.

Each blow leaves a mark; the objective is to create a homogenous surface with consistent marks. To achieve this, hold the work securely against the bench block; the hammer strikes should be of equal force and angle. Any scratches on the tool will transfer to the metal, so polish out any dings if necessary.

To keep your tool marks consistent, focus the range of blows on a small area of the anvil or block. Instead of moving the hammer, move the spiculum under the hammer, rolling and rotating it as the hammer rises and falls, covering every surface with equal strikes.

Planishing with the domed face of a goldsmith's hammer

Planishing/texturing with the ball peen of a chasing hammer

Planishing/texturing with a wedge-shaped peen

CREATE Kinetic Wire Cluster EARRINGS

Combine delicate forging and production assembly techniques to make silver earrings with a twist.

by Annie Pennington

There's something about jewelry with moving parts that just gets to me. I lovingly refer to these as my fidget earrings — the many moveable elements give me something to play with if I need a distraction. I started making this style of earrings in 2011, and have experimented with multiple variations on a theme ever since then. This pair is made with only one material — over a yard of silver wire — but it requires patience and perseverance to finish each component properly.

materials

- Sterling silver wire: 20-gauge (0.8 mm), half-hard, 40 in. (101.6 cm)

toolboxes, *page 77*

- Wirework
- Soldering/Annealing

additional tools & supplies

- Plastic bags or ceramic dishes
- Cup bur, 1 mm

Find out where to buy supplies, *page 79*
See Safety Basics, *page 77*

BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B	
Textured finishes		●
Lighting and using a torch		●
Balling the end of wire	●	●
Pickle basics	●	●
Wrapped loop	●	●

B Basics, *page 75*
Videos, www.artjewelrymag.com/videos

Cut the wires. Use flush cutters to cut four pieces of each of the following lengths of 20-gauge (0.8 mm) half-hard sterling silver round wire:

- 1 in. (25.5 mm)
- 1¼ in. (32 mm)
- 1½ in. (38 mm)
- 1¾ in. (44 mm)
- 2 in. (51 mm)
- 2½ in. (64 mm) (set these aside)

NOTE: Keep each length of wire separated and grouped together as you work. I use plastic bags or little ceramic dishes to keep them sorted. It's easy to tell the lengths apart now, but after you form them, it will become a bit trickier.

Forge the wires. Hold a 2-in. (51 mm) wire on a steel bench block, and use the slightly domed face of a planishing hammer to flatten one end into a paddle **[1]**. Try to make a graduated taper from the center toward the end. Flip the wire over as needed to form an even taper.

Repeat to form a taper on the other end of the wire in the same plane as the first **[2]**. Keep the center ¼ in. (6.5 mm) of the wire round in profile.

Repeat to form a taper on both ends of each wire.

NOTE: If you want more texture on your wires, now's the time to add it. Use a small ball-peen or a narrow cross-peen hammer to texture the paddle ends. Make sure the textured side on both ends is facing up.

File and sand the wires. Use a flat needle file to round each end of the wires **[3]**. Sand each wire with 400-grit sandpaper to remove any file marks, refine the surface of the wire, and create an even, satin finish.

NOTE: If you want your earrings to have a high polish, work through progressively finer grits of sandpaper to achieve your desired finish.

Form the central loops. Center a 2-in. (51 mm) wire at the tip of a pair of round-nose pliers. Make sure the paddles are flat and perpendicular to the jaws. (If you've added texture, make sure that side faces up.) Hold the pliers with the wire parallel to you, and wrap the ends of the wire evenly around one jaw of the pliers until the ends cross each other and are parallel again **[4]**. Make note of which end of the wire is on top of the wrap; you'll want to wrap each wire in the same orientation.

Use two pairs of nylon-jaw flat or chain-nose pliers to adjust the paddle ends so that they're parallel to each other and the central loop.

Repeat to form a central loop in each of the wires.

Curve the wires. Choose three mandrels (I use dapping-punch shanks). The exact sizes don't matter, but you'll want three with approximately 9/32-in. (7 mm), 23/64-in. (9 mm), and 17/32-in. (13.5 mm) diameters.

Place a 2-in. (51 mm) wire against the 17/32-in. (13.5 mm) mandrel. Use your thumb or a finger to hold the loop firmly against the mandrel, and then wrap the ends of the wire around the mandrel **[5]**.

See "Data Sheet: Making Ear Wires," *page 67*, for great tips (and a bonus how-to) on how to make durable and show-stopping ear wires.

Subscribers: Learn to make six more types of ear wires! Watch our slideshows at **www.artjewelrymag.com/reference**.

design options

- Use fewer curved wires and stack them in the opposite direction: from small to large. This will change the profile and length of the earrings.
- Apply a liver-of-sulfur patina, and then remove it selectively (*page 56*) by stroking a folded strip of sandpaper downward on the earring. You can also use pumice powder for a more subtle removal.
- Try using different metals, or patinating some of the curved wires before assembling the earrings to create a bold look.
- Alternate textured and smooth wires to create textural variety.
- Stack seed beads or short lengths of tubing between the curved wires to lengthen the earrings or add a pop of color.

The ends will be work-hardened and won't want to curve, so use your thumbnails or a rawhide mallet to form the tips around the mandrel **[6]**.

NOTE: Since you've forged the wire, it will spring back quite a bit from the mandrel.

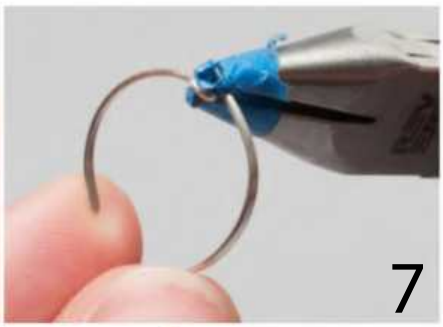
Remove the wire from the mandrel. Use the tip of a pair of chainnose pliers to grasp across the loop, perpendicular to the wire. Squeeze the pliers and adjust the ends so that the loop is flat and parallel to the forged ends **[7]**. Use sandpaper to remove the tool marks.

Form each 2-in. (51 mm) wire. Use the following mandrels to form each of the remaining wires:

- 1-in. (25.5 mm) wire: 9/32-in. (7 mm) mandrel
- 1¼-in. (32 mm) wire: 9/32-in. (7 mm) mandrel
- 1½-in. (38 mm) wire: 23/64-in. (9 mm) mandrel
- 1¾-in. (44 mm) wire: 17/32-in. (13.5 mm) mandrel

Adjust the curved wires. To adjust the arcs of each wire, hold the loop in one hand and use the thumb and index finger of your other hand to stroke the wire ends downward. Each wire should have a curve that's the same arc in proportion to the length of the wire, not necessarily the same diameter **[8]**.

Ball up the remaining wires. Grasp one of the 2½-in. (64 mm) wires you set aside earlier in a pair of cross-locking tweezers. Dip the lower end in flux. Use a torch to

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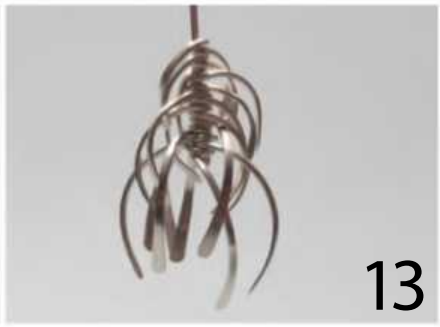

13


14

ball up wires evenly

It's easy to ball up the end of a wire, but it's a little trickier to ball up two wires so that the ends match. Rather than balling up one wire to the size you need and trying to match the second wire to it, hold both wires vertically in separate cross-locking tweezers in third hands and move back and forth between the two wires, balling them up incrementally.

ball up the end of the wire. Repeat to ball up one end of each 2½-in. (64 mm) wire. Keep the balls as close in size as possible (see "Ball up Wires Evenly," *above right*).

Place the wires in pickle to clean them, and then rinse and dry them. Pick two wires with similar-sized balled-up ends, and set the other two aside for head pins.

Form the ear wires. Grasp a wire next to the balled-up end with the smallest jaw of a pair of stepped roundnose pliers. Wrap the wire around the jaw until the ball touches the straight part of the wire **[9]**. (Immediately repeat each step for a second wire to make matching ear wires.)

NOTE: For more secure ear wires, solder the loop closed. Place the wire on a soldering board, apply flux to the join, and use hard solder to solder the loop closed. Pickle, rinse, and dry the ear wire.

Use chainnose pliers to make a sharp bend ½ in. (13 mm) above and in the opposite direction of the loop. Center the bend on the 9/32-in. (7 mm) diameter mandrel, and pinch the loop and straight end of the wire around it until they almost touch **[10]**.

Use chainnose pliers to make an outward bend in the straight end of the wire in line with the loop. Trim the end about ¼ in. (6.5 mm) below the bend **[11]**.

Use a 1 mm cup bur to round the end of the wire, and use 400-grit sandpaper to smooth it further.

Forge the ear wires. Place the ear wire on the bench block, and use the planishing hammer to gently forge the front half of the ear wire and the loop (not the balled-up end, unless you want to). Stop before you reach the portion that will be inserted into the ear. Work from both sides, and then use 400-grit sandpaper to refine the ear wire.

Assemble the earrings. Thread two curved 2-in. (51 mm) wires onto a head pin **[12]**.

NOTE: As you assemble the earrings, vary the orientation of the downward-facing ends of the curved wires. This gives the earrings a more freeform look. The smaller wires will partly lock in the orientation of the larger wires.

Repeat to thread two 1¾-in. (44 mm), 1½-in. (38 mm), 1¼-in. (32 mm), and 1-in. (25.5 mm) wires onto the head pin **[13]**.

Grasp the head pin ⅛ in. (1.5 mm) above the curved wires with the tip of the roundnose pliers. Form the first half of a wrapped loop, thread it through the loop in an ear wire, and then finish the wrapped loop. Use chainnose pliers to tuck in the cut end **[14]**.

NOTE: Don't wrap down to the curved wires. You want there to be a little play so that the curved wires can rotate freely.

Repeat to assemble the second earring, and then finish the pair as desired. For the pair of earrings shown on *page 56*, I used a liver-of-sulfur patina and removed some of it with pumice powder.

ASK THE ARTIST: ANNIE PENNINGTON

You've been given $10,000! What goodies will your studio get?

"The first thing I'd do is move my studio to a new location. My current studio is in a loft in my boyfriend's guitar-repair shop, and the ceiling is only about an inch above my head (all's well if I'm sitting down …). I'd also invest in setting up better ventilation, a high-quality rolling mill, a larger torch, and I'd spend the rest on metal and marketing materials."

Contact: apennington@artjewelrymag.com

Marquise Box

by Marthe Roberts/Shea

Named for its shape (like a marquise-cut gemstone), this box is less than 3 in. (76 mm) wide and is under 2 in. (51 mm) tall. It's a great receptacle for small items that you use or wear often — such as earrings, rings, or spare change.

Everyone enjoys vessels where they can stow small, meaningful items. In this new series, I'll show you how to make six tiny treasure holders.

materials

- Sterling silver sheet:
  - 22-gauge (0.6 mm): 2½ x 1 in. (64 x 25.5 mm), 2 pieces; 3 x 1½ in. (76 x 38 mm), 2 pieces
  - 24-gauge (0.5 mm): 2 x ⅛ in. (51 x 3 mm), 2 pieces; 1¼ x 1¼ in. (32 x 32 mm) 1–2 pieces, based on design

toolboxes, *page 77*

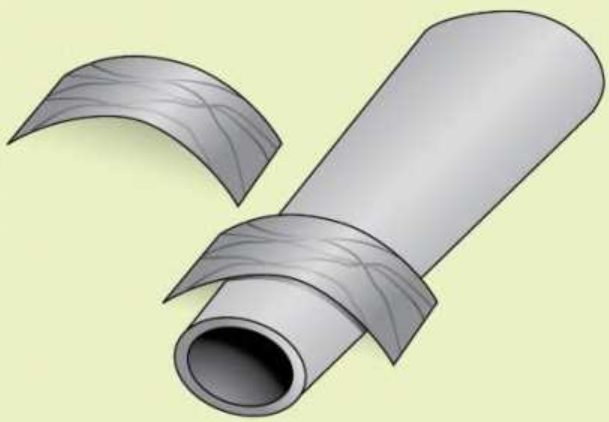
- Sawing/Piercing
- Soldering/Annealing

additional tools & supplies

- Rolling mill and scrap wire (optional)
- Oval bracelet mandrel
- 220-grit sandpaper
- Pliers: parallel, half-round
- Straight burnisher (optional)
- Circle template or disk cutter
- Wooden dapping block and punches
- Polishing materials or patina (optional)

Find out where to buy supplies, *page 79*
See Safety Basics, *page 77*

BOX BODY

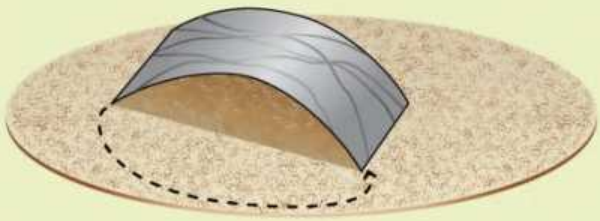


1 Use a jeweler's saw with a #2 blade to cut two 2½ x 1-in. (64 x 25.5 mm) pieces of 22-gauge (0.6 mm) sterling silver sheet for the walls of the box.

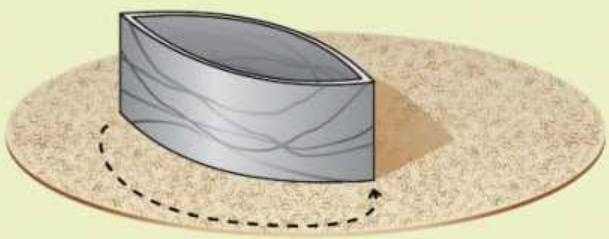
NOTE: If you want to texture to your metal for the walls and the handle, do so before cutting the sheet to size. For my box, I wrapped wire around the sheet and ran it through the rolling mill.

Use an oval bracelet mandrel and your fingers to form an arc in the center of each sheet. You don't have to bend the metal completely, just the center of each sheet. Make sure the arcs match.

To see other examples of stunning boxes and lockets, see "On Trend: Boxes & Lockets," *page 64*.



2 Sand the ends of each wall in a circular motion on a sheet of 220-grit sandpaper to miter the ends. This will ensure a nice, clean solder join at each end of the walls.

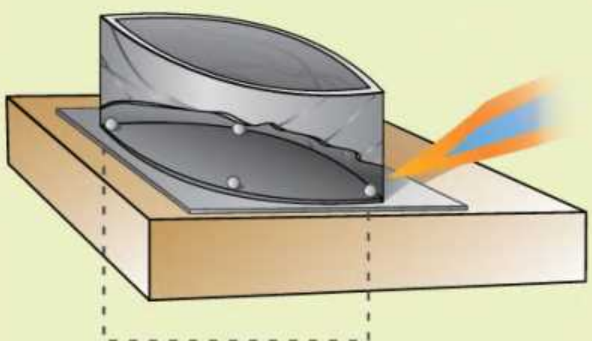


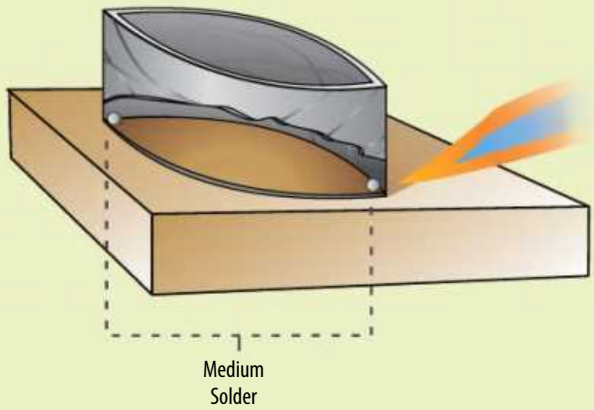
4 Sand the top and bottom edges of the walls until they are flat. Hold the piece flat on the sanding surface to ensure a level join when you attach the base.

5 Place the walls on top of a 3 x 1½-in. (76 x 38 mm) piece of 22-gauge (0.6 mm) sterling silver sheet. Move both pieces to the soldering board.

Apply flux along the inside bottom edge of the join. Place pallions of easy solder inside the walls at the 12, 3, 6, and 9 o'clock positions.

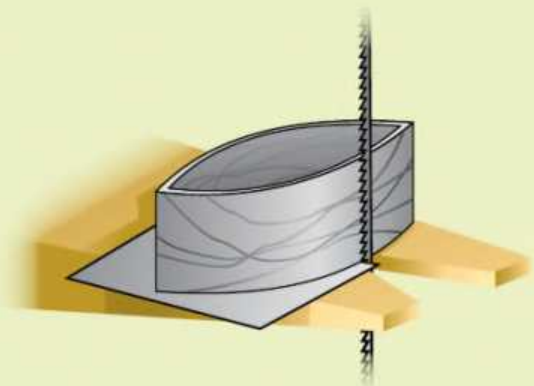
Use a circular motion to evenly heat the piece from the outside, then concentrate the heat on the join between the walls and the floor of the box until the solder flows. Pickle, rinse, and dry the assembly.



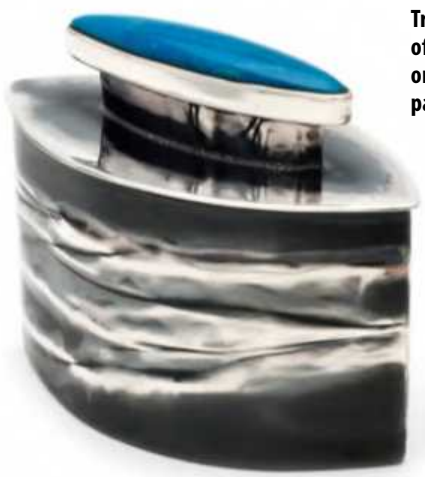


3 Position the walls together on a soldering board with the mitered ends flush against each other. If needed, use T-pins to help align the halves.

Apply flux to the joins. Place a small pallion of medium solder inside the walls at the bottom of each join. Move your torch in a circular motion to heat the walls from the outside, then concentrate on the joins to draw the solder out and up the length of the join. Pickle, rinse, and dry the walls.

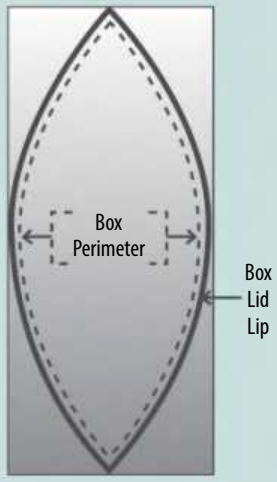


6 Use the jeweler's saw to trim the excess metal from the floor of the box. Use a #2-cut half-round file to file the cut edge until it's flush with the walls.



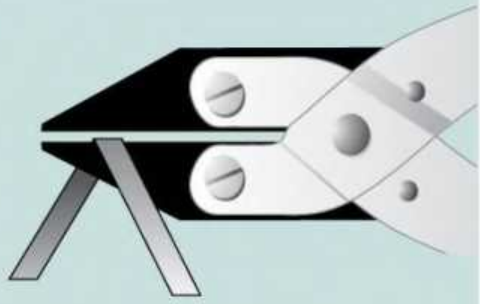
Try making a different style of handle by setting a cabochon on an elevated silver post and patinating the box!

BOX LID



7 Place the body of the box upside down on a 3 x 1½-in. (76 x 38 mm) piece of 22-gauge (0.6 mm) sterling silver sheet. Use a fine-tip permanent marker to trace around its perimeter. Extend the perimeter line ⅛ in. (3 mm) on all sides. This will be the cut line for the lid.

Use the saw to cut outside the extended lip line. File the edges up to the line.



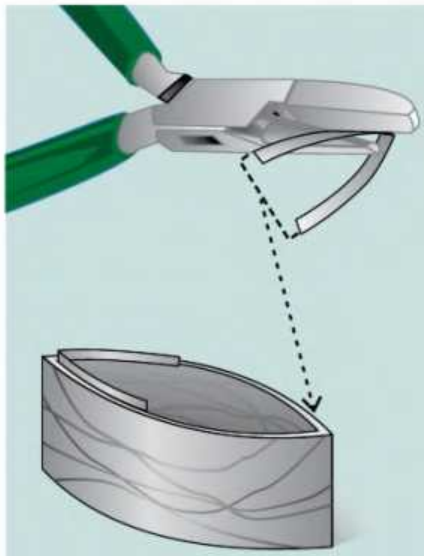
8 Cut two 2 x ⅛-in. (51 x 3 mm) pieces of 24-gauge (0.5 mm) sterling silver sheet. Mark the center of each strip.

Use parallel pliers as a bending brake to bend each strip at its midpoint to about a 45° angle.

BASICS & VIDEOS

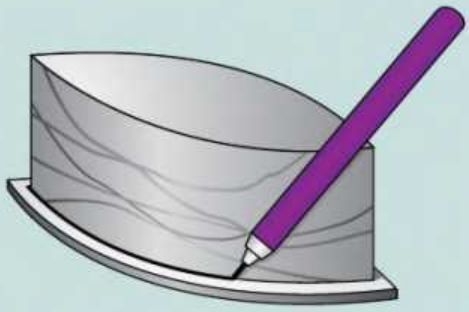
Learn fundamental techniques in these bonus tutorials:	B		
Basic sawing of metal	●	●	
Roll-printing metal		●	
Soldering	●		
Pickle basics	●	●	
How to file		●	
Drilling through metal	●		Art+
Using a disk cutter		●	
Using a dapping block	●	●	

B Basics, *page 75*
Videos, www.artjewelrymag.com/videos
Art+ Subscriber video, www.artjewelrymag.com/subvideos



9 Use half-round parallel pliers to form a slight curve in the legs of each strip. Fit a strip into both corners of the box, matching the legs to the contour of the box's internal curve.

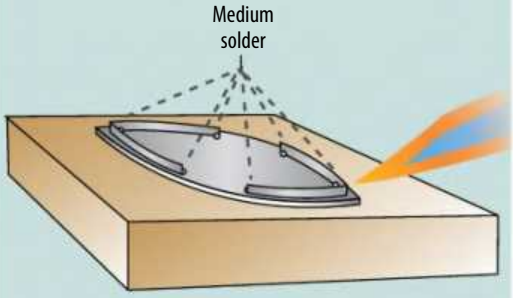
If the contour doesn't match, rub a straight burnisher against the strips while they're inside the box to form the strip the rest of the way.



10 Invert the body of the box and place it upside down and centered on top of the underside of the lid. Use the marker to trace around the box's perimeter again. Place the formed strips on the lid at least 0.6 mm (the wall thickness) inside the perimeter line.

Box shown actual size

Marthe Roberts/Shea's work has been shown in galleries nationally and has appeared in Art Jewelry*'s Gallery. She teaches jewelry making at the Cheltenham Center for the Arts (Cheltenham, Pa.) and the Main Line Art Center (Haverford, Pa.). She is also the president of the Pennsylvania Society of Goldsmiths. You can reach her via her website,* ***www.jewelrybymars.com****.*

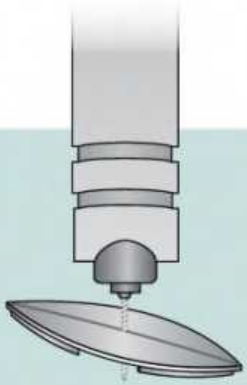


11 Set the lid strip-side up on a soldering pad. Place a pallion of medium solder inside the strip at each corner and at the ends of each strip. The solder should rest against the strip and the inside of the lid.

Heat the piece evenly, and then concentrate on the areas where the strips meets the lid until the solder flows.

NOTE: Be careful. The strips are small and will heat up more quickly than the lid.

Pickle, rinse, and dry the lid.



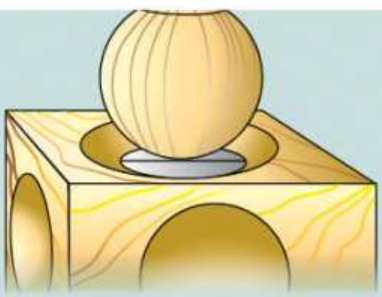
12 Turn the lid over (flat side up) and use the marker to draw a line from one point to the other. Measure this line, and then find the center. Make a mark at this center point.

Use a scribe to make a divot at the mark, then use a #60 (0.040-in./1.02 mm) drill bit to drill a hole at the divot. This will allow airflow while you solder the handle to the lid.

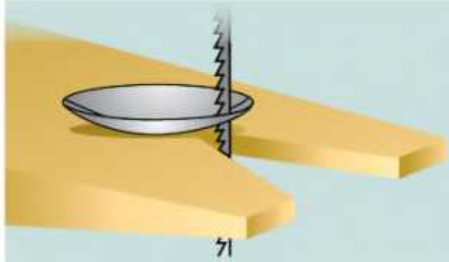
13 Use the marker and a circle template to draw a 1⅛-in. (29 mm) circle on a piece of 24-gauge (0.5 mm) sterling silver sheet. Use the template's tic marks to determine the vertical center of the circle. Draw a line through the center of the circle, dividing it in half.

Use a disk cutter or the jeweler's saw to cut out the disk. Redraw the centerline, if necessary.

NOTE: If you want a taller handle like mine, decide how tall you want yours to be, cut two disks, and mark a straight line at the same point on each disk instead of a centerline.

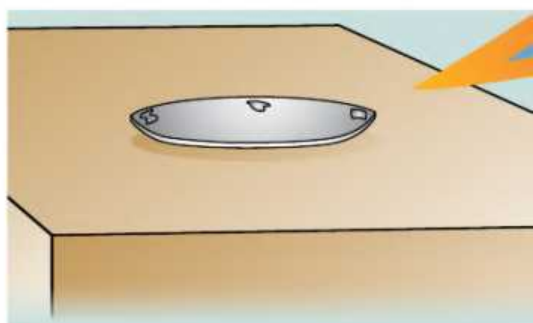


14 Place the disk line-side up in the largest indentation of a wooden dapping block. Lightly dap it until you form a shallow dome.

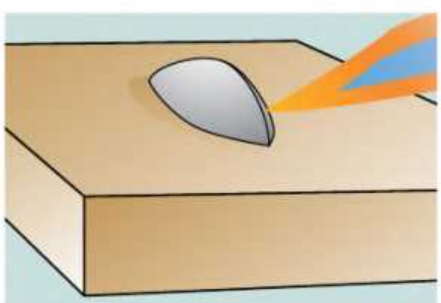


15 Place the dome on the sandpaper, and sand in a circular motion until the dome's rim is even.

Saw the dome in half, using the centerline as a guide.

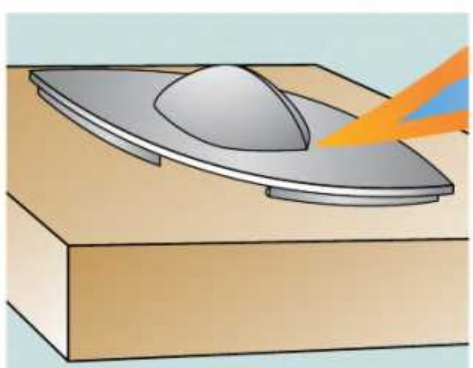


16 Sweat a small amount of medium solder just inside the sanded rim of one half of the dome.



17 Place both halves of the dome, sanded edges together, on the soldering pad (use T-pins to stabilize them as needed). Apply flux to the join, and heat the assembly from the outside until the solder flows. Pickle, rinse, and dry the handle.

Place the handle open-side down on the sandpaper and sand in a circular motion until the bottom is flat.



18 Sweat easy solder just inside the handle's open edges. Place the lid on the soldering pad. Center the handle on the lid over the drilled hole. Apply flux to the bottom of the handle, and heat the assembly until the solder flows. Pickle, rinse, and dry the lid.

FINISHING

19 Fit the box lid into the body of the box. It should fit snugly. If it isn't snug enough, use a straight burnisher to push the bottom of the lid's lips out slightly. If the fit is too snug, use half-round parallel pliers to move the lips in a bit. Sanding the lips to reduce the bulk might help, too.

Polish or patinate the piece as desired. AJ

Illustrations by Marthe Roberts/Shea.

BOXES & LOCKETS

Throughout the history of jewelry, lockets have held everything from the traditional photographs of loved ones to locks of hair, keys, and even, in some periods of intrigue, poisons. Contemporary jewelry artists have taken the idea of a piece of jewelry that hides treasures to intriguing extremes; many see the interior of the hidden compartment as a way to tell a story or a joke, as well as a receptacle for a valuable memento. Some metals artists have taken things even further, and their pieces are standalone boxes to hold keepsakes. Take the concept of a box even further, and you have a sculptural (or functional!) teapot. AJ

▲ ***Large and Small Male Sea Otter*** **pin/pendants by Denise Wallace. Sterling silver, 14k gold, fossil ivory. Large pendant is 4½ in. (11.4 cm) long.** Photos by Kiyoshi Togashi, NYC. **www.denisewallace.com**

◀ ***A Tear for Icarus*** **locket, by Terry Kovalcik. Fine-silver metal clay, 22k gold (Aura 22), sterling silver chain. 2¼ x 1 x ⅝ in. (57 x 25.5 x 16 mm).** Photos courtesy of the artist. **www.terrykovalcik.com**

▼ **Locket (pin/pendant) by Vicki Ambery-Smith, based on the Pantheon in Rome. Sterling silver, rose and yellow gold. 40 x 48 mm (1⁹⁄₁₆ x 1⅞ in.).** Photo courtesy of the artist. **www.vickiamberysmith.co.uk**

▲ ***Annabelle*** **locket, by Ginger Meek Allen. Sterling silver spoons, sapphire, ultrasound photo. Approximately 2 in. (51 mm) long.** Photos courtesy of the artist. **www.gingermeekallen.com**

▲ ***Make a Wish*** **locket, by Abigail Heuss. Silver, enamel, eyelashes. 2 x 2 x ½ in. (51 x 51 x 13 mm).** Photos by the artist. **www.abigailheuss.com**

▶ ***Poe's Reliquary Box*** **(with chain and charm) by Christi Anderson. Fine-silver metal clay, wax, feather, paper, ruby. 4 x 3 x 3 in. (10.2 x 7.6 x 7.6 cm).** Photo courtesy of the artist. **www.etsy.com/shop/eadornments**

◀ ***Late in the Day*** **teapot, by Noël Yovovich. Sterling and fine silver, copper, anodized titanium, tigereye, black coral. 7 x 5 x 3 in. (17.8 x 12.7 x 7.6 cm).** Photo by Larry Sanders. **www.noelyovovich.blogspot.com**

▲ ***Keeper of Good Fortune*** **locket by Taylor Saleem. Sterling and fine silver. 1¼ x 1¼ x ¾ in. (32 x 32 x 19 mm).** Photo by the artist. **www.taylorsaleemjewelry.com**

▶ ***November 1954*** **locket, by Richard Salley. Vintage camera lens, photograph, sterling silver, bronze, garnet.** Photos courtesy of the artist. **www.rsalley.com**

◀ ***In Case of Fire*** **locket, by L. Sue Szabo. Sterling silver. 2 x ½ in. (51 x 13 mm).** Photos courtesy of the artist. **www.lsueszabo.com**

Data Sheet:
Making Ear Wires

Metal choice

Make ear wires out of sterling silver or other precious-metal alloys (not base metals). You'll spend the same amount of time and effort making base-metal ear wires as you will if you use finer-quality metals, so use better materials to begin with (base metals are great to practice with — and for demonstrations, as in the photos on *page 68*!). The cost for such a small amount of wire isn't prohibitive, and you'll end up with a more versatile, valuable ear wire. Many people are sensitive to base metals (especially nickel), so keep that in mind when designing your ear wires. For severe metal allergies, go for niobium or implant-grade titanium (don't use good cutters with titanium).

Wire gauge

The most common gauges for hook-style ear wires are 20- and 22-gauge (0.8 and 0.6 mm). These wires are thin enough that they easily fit through a pierced ear, but can be work hardened to hold their shape. Only those who wear earrings regularly will be able to wear thicker, 18-gauge (1.0 mm) ear wires. 24-gauge (0.5 mm) wire is too thin, as it is easily deformed. Use thicker-gauge wire (20 gauge [0.8mm] or larger) for post earrings. For sturdier ear wires, use half-hard or hard wire instead of dead soft.

Length considerations

Make sure that earrings with no catch (such as hook-style ear wires, *below*) extend at least ¾ in. (19 mm) down behind the ear. This helps balance the earring and prevents it from tipping forward and falling out of the earlobe. You can also add plastic ear nuts for added security.

Make them match

If you want to make two earrings that match, tape the wires together and form them around a mandrel at the same time. Use a fine-tip permanent marker to mark your wires, pliers, and mandrels so you can easily line up the marks to repeat bends. Stepped forming pliers (or other cylindrical mandrels) make it easier to form matching ear wires since you don't have to worry about the taper of traditional roundnose pliers.

Work-hardening

You don't want the shape of your ear wires to distort with use, so always work-harden your ear wires to make them as springy as possible. There are many ways to do this either before or after forming the wire, so choose the way that works best for you.

- Twist wire before forming the ear wires (twisting round wire won't change its profile).
- Roll wire between two steel bench blocks before forming it.
- Pull wire through nylon-jaw pliers to straighten and slightly harden the wire.
- Use a steel burnisher to burnish wire before forming it.
- Hammer the ear wires with a rawhide or nylon mallet on a steel or nylon block after forming them.
- Tumbling ear wires with stainless-steel shot will only work-harden the surface (not the core) of the wire, but it will give them a bit of added springiness.

Finishing

Finish your ear wires properly. Wire cutters leave a sharp edge that can injure the wearer. The ends of the wire should be smooth, and able to slide easily through the earlobe. Use a cup bur or sandpaper to round the end. Sand the ear wires to remove all plier marks.

variations

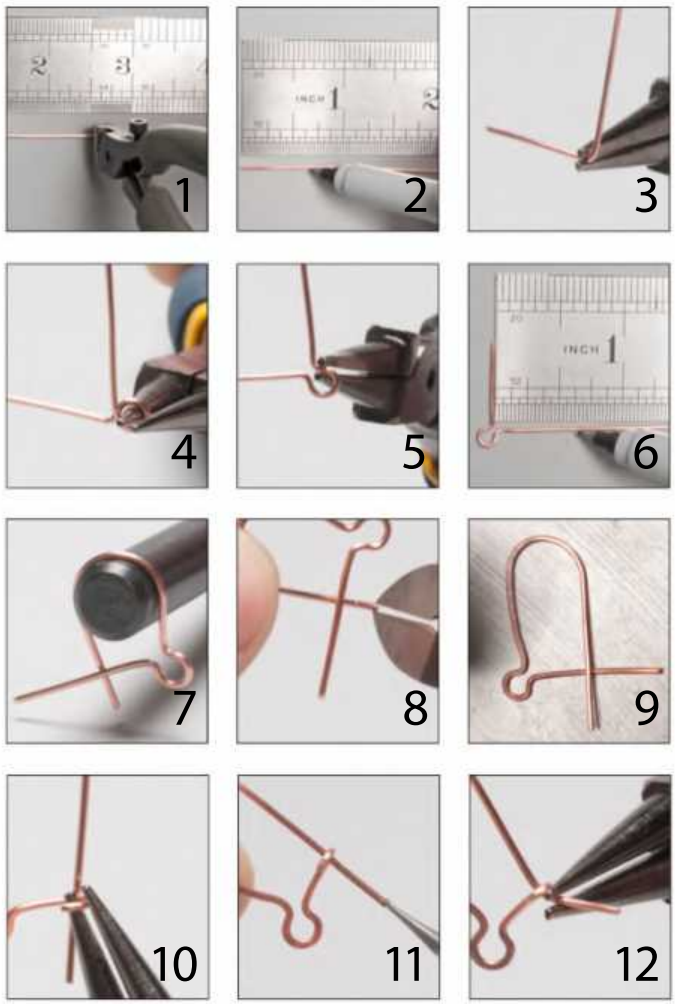
Ball up one end of the wire before forming the ear wire.

Make a plain (*left*) or wrapped loop (*right*) on the end of the ear wire before forming it.

Add a bead or coil of wire after you form the loop.

Experiment with the size and shape of the ear wire.

How to: Kidney Ear Wires



This style of ear wire is simple to make, can be adapted to any length you desire, and provides a secure way to latch your earring to prevent you from losing it.

Cut the wire. Cut two 2½–3 in. (64–76 mm), 18–22-gauge (1.0–0.6 mm) sterling silver wires **[1]**. Repeat each step to make matching ear wires.

Form the dangle loop. Make a mark with a fine-tip permanent marker ⅝ in. (16 mm) from one end of a wire **[2]**. Use chainnose, flatnose, or roundnose pliers to make a 90° bend at the mark **[3]**.

Place the tip of a pair of roundnose pliers at the bend. Wrap the long end of the wire around one jaw. Reposition the pliers, and continue to wrap the wire into a loop **[4]**.

Reposition the wire so that the long end points down. Grasp the loop where the ends overlap with the tip of a pair of chain-nose pliers, and bend the long end up, forming a right angle between the long and short ends with a loop at the corner **[5]**.

Form the hook. Make a mark on the long end of the wire ⅝–1¼ in. (16–32 mm) up from the loop **[6]**. This will determine the length of your ear wire, and can be any length.

Center the mark on a round mandrel, and bend the wire down around the mandrel. Make sure the long end of the wire overlaps the short end at a 90° angle **[7]**.

Trim the long end of the wire so that it extends approximately ¼ in. (6.5 mm) beyond the short end **[8]**.

Forge the ear wire. Set the ear wires on a steel bench block. Use a mallet to harden the entire wire, especially the part that will go through the ear. Use a planishing hammer to forge (flatten) the loop and the front part of the earring that will not go through the ear **[9]**. Re-form the rounded part of the ear wire as necessary.

Form the catch. Use roundnose pliers to form a small hook on the short end of the wire, perpendicular to the rest of the ear wire **[10]**. If desired, trim the end shorter before forming the hook. Make this hook in the other direction on the second ear wire.

Refine the ear wire. Use an appropriately sized cup bur or sandpaper to smooth the ends of the ear wire and the hook, and remove all burrs **[11]**. Wire cutters leave a sharp edge that can injure the wearer; always smooth the cut end.

Latch the long end into the hook. It should be quite springy. Use roundnose pliers to make a slight outward bend in the long end of the ear wire **[12]**.

Art+ Subscribers: See six FREE ear-wire tutorials at **www.artjewelrymag.com/reference**.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No matter what medium you work in, there are some jewelry-making techniques that are so essential, you'll use them in nearly every project you make. These tutorials will walk you through the beginner techniques that you'll need to learn in order to make the projects in this issue.

See these FREE videos at www.artjewelrymag.com/videos!

- **Basic sawing of metal**
- **Pickle basics**
- **Annealing metal**
- **Sweat soldering**
- **Balling the end of wire**
- **Wrapped loop**
- **Using a dapping block**
- **Tips for working with liver of sulfur**
- **Making a bezel, 5 parts**
- **Setting a cabochon in a bezel, 3 parts**

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- **Drilling through metal**
- **Liver of sulfur patina**

metalworking techniques

DRILLING

Place your metal on a steel bench block or anvil. Use a center punch and a mallet to create a dimple where you want to drill a hole **[Figure 1]**. Place the metal on a piece of wood and use a flex shaft or rotary tool and a drill bit to drill a hole at the dimple **[Figure 2]**.

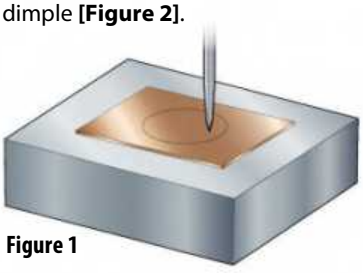


Figure 1

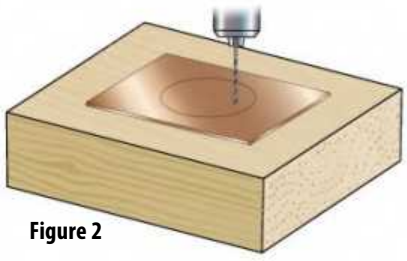


Figure 2

PATINATING WITH LIVER OF SULFUR

Polish your piece before patinating. (If you tumble-polish your piece after patinating, reserve the used shot for future patinated pieces, or scrub and rinse your shot and barrel; liver of sulfur residue can contaminate other pieces.) Oil and dirt on the piece can affect the patina, so use a degreasing soap to clean the metal before patinating.

Prepare a liver of sulfur solution according to the manufacturer's instructions. Dip your metal in the solution with tweezers for a few seconds, then rinse the metal in cool water to stop the chemical reaction. For a darker patina, continue to dip and rinse the metal. Use a brass brush with soapy water, a polishing cloth, or pumice powder to remove or modify the patina. By using different amounts and temperatures of water to make the liver of sulfur solution, you can create different colors of patina; experiment until you achieve the desired color.

If you don't want your entire piece to have a patina, use a soft-bristle brush to apply the liver of sulfur solution to select areas. Dip your brush into the solution, and dab it onto your piece. Follow the same instructions as above until you achieve the desired color.

SAWING

Select a saw blade that is the correct size for the gauge (thickness) of metal that you are going to cut.

To thread a saw blade, insert the blade with the teeth of the blade facing down and out, away from the frame, into the top wing nut of the saw frame. Tighten the wing nut. Brace the handle in the hollow of your shoulder, and apply pressure to the saw frame against your bench pin. Maintaining pressure, insert the bottom of the blade into the wing nut closest to the handle, and tighten the wing nut **[Figure 1]**.

The blade should be taut and should make a high-pitched "ping" sound when you pluck it with your thumbnail. If you get a dull "twang" instead, reinstall your blade while putting pressure on the saw frame. Then, lubricate the blade.

When sawing, maintain an erect sitting posture with the top of your workbench at upper chest level. Slouching or having your work too low causes back and wrist strain and leads to broken blades.

To saw, grip the saw frame loosely. Use long, smooth motions, using as much of the blade as possible. The blade will work best when it's perpendicular to the metal **[Figure 2]**. Putting excessive pressure on the saw frame will make you work harder. Turn corners by sawing in place while slowly turning the metal; trying to turn the saw will break the blade.

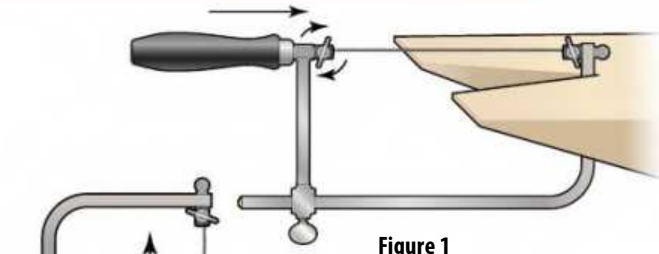


Figure 1

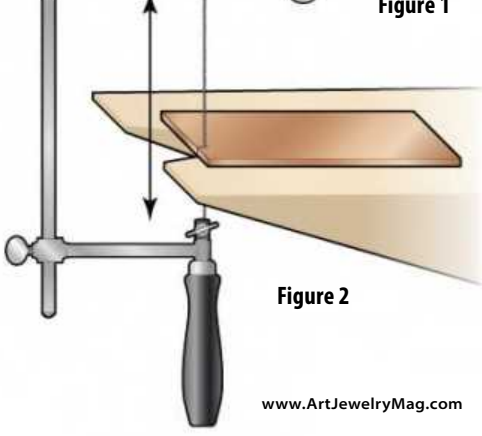


Figure 2

SOLDERING

Use 400-grit sandpaper to clean the metal you plan to solder. Solder won't fill gaps; surfaces must be clean and in complete contact with each other for solder to flow. Apply flux to the metal to prevent oxidation and to help solder flow. Heat the entire piece evenly, not just the solder, and keep the torch moving in a circular motion.

If there is more than one solder join in a piece, solder the first using hard solder, the second using medium solder, and the third using easy solder, as hard solder has the highest melting point and easy solder has the lowest. To keep the solder in previous joins from flowing when you heat the metal again, apply antiflux to those areas.

During soldering, the solder will flow toward where the heat is the greatest. If your solder is flowing in the wrong direction, adjust the direction of your flame.

Once the solder flows, quench the piece in water. Then, place it in a pickle solution to remove oxidation and flux residue. Rinse the piece in clean water.

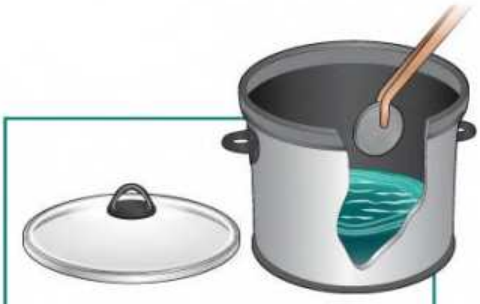
SANDING

To give your metal the desired finish, smooth the surface and edges by sanding with progressively finer grits of sandpaper. Begin with a coarse grit (220–400) and work up to a fine grit (600–1000). Rub each grit of sandpaper back and forth in one direction. When you switch to the next finer grit, rub the sandpaper perpendicular to the marks from the previous grit until you can no longer see them.

ANNEALING

Annealing restores malleability to work-hardened metal. Place the metal on a soldering pad and heat it with a torch. When the metal has a dull, rose-colored glow, it is annealed. Quench the metal in water.

NOTE: For "Classic Hollow Form: How to Make a Spiculum," *page 50*, the author expressly advises against using pickle when annealing and soldering the form.



PICKLE

Pickle is a mildly acidic solution that cleans oxides from metal by removing small amounts of copper. Pickle is generally sold in powdered form and is available from jewelry supply companies. To make pickle, follow the manufacturer's instructions to mix the powder with water in a pickle pot dedicated to non-food use.

If steel (binding wire or tweezers) comes in contact with used pickle, it can cause a chemical reaction that will copperplate whatever metal is in your solution. To prevent this, use copper or plastic tongs to place metal in the solution.

SWEAT SOLDERING

Apply flux to both metal pieces you want to join. Place the smaller piece on a soldering pad. Heat the piece until the flux is a white crust. Place pallions of solder on the smaller metal piece, and heat it until the solder flows **[Figure 1]**. Using soldering tweezers, position the smaller metal piece solder-side down on the larger piece. Heat both pieces from above and below (if using a tripod) until the solder melts again **[Figure 2]**. A bright line of silver will appear at the edge where the two metal pieces meet, and the smaller piece may drop slightly to indicate that the solder has reflowed.

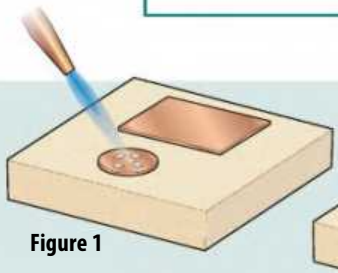


Figure 1

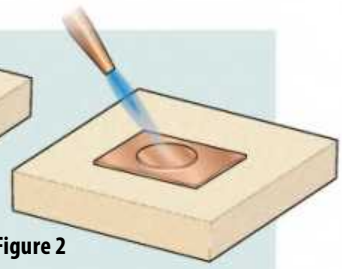
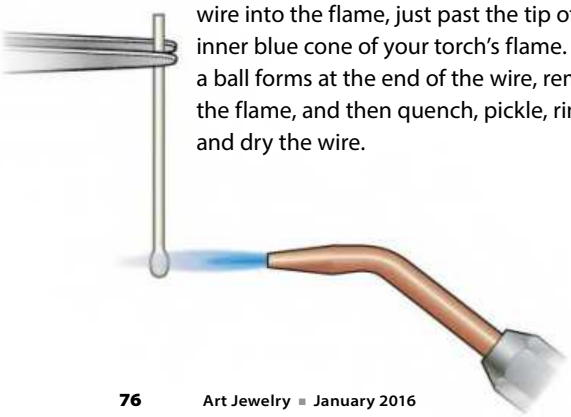


Figure 2

wirework techniques

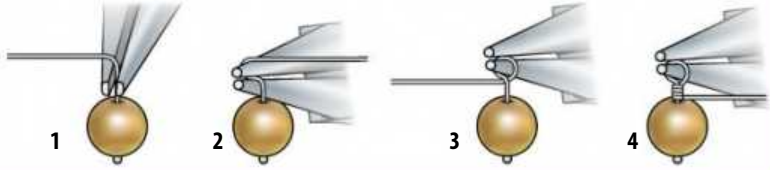
BALLING UP WIRE

Use cross-locking tweezers to grasp a piece of wire, and dip the wire in flux. Hold the wire vertically, and lower one end of the wire into the flame, just past the tip of the inner blue cone of your torch's flame. After a ball forms at the end of the wire, remove the flame, and then quench, pickle, rinse, and dry the wire.



MAKING A WRAPPED LOOP

Trim the wire 1¼ in. (32 mm) above the object. Use the tips of your chainnose pliers to grasp the wire directly above the object. Bend the wire into a right angle **[1]**. Using roundnose pliers, grasp the horizontal portion of the wire near the bend, and then bend the wire over the top jaw of the pliers **[2]**. Reposition the lower jaw of the pliers in this half loop. Curve the wire around the bottom jaw of the pliers **[3]**. Wrap the tail around the wire stem **[4]**. Trim the excess wire. Use chainnose pliers to press the cut end close to the wrap.



See everything in these toolboxes and download a FREE PDF at **www.artjewelrymag.com/reference.**

toolboxes

Wirework

- Bench block or anvil
- Cutters: side, end, or flush
- Hammers: chasing, ball peen, cross peen
- Mallet: rawhide or plastic
- Mandrels or dowels
- Needle files
- Pliers: chainnose, flatnose, roundnose, parallel, nylon jaw
- Polishing cloth
- Sandpaper: various grits
- Tumbler, steel shot, burnishing compound

Soldering/Annealing

- Anti-flux
- Binding wire
- Borax (for borax solution)
- Copper tongs
- Fire-resistant surface: soldering pad, firebrick, or charcoal block
- Flux, flux brush
- Pickle pot with pickle
- Solder: hard, medium, easy
- Soldering pick
- Striker: manual or automatic
- Third hand, insulated cross-locking tweezers
- Torch, various tips
- Sandpaper: various grits
- Tumbler, steel shot, burnishing compound

Sawing/Piercing

- Adhesive bandages
- Alligator tape (optional)
- Bench pin
- Center punch: manual or automatic
- Dividers
- Files: hand or needle
- Flex shaft, drill bits
- Jeweler's saw frame, saw blades
- Lubricant or beeswax Rubber cement or glue stick
- Safety glasses

Finishing

- Brass brush
- Copper tongs
- Files: hand, needle
- Flex shaft or buffing wheel, buffs, polishing compound
- Liver of sulfur or a different type of patina, lidded glass container
- Microcrystalline wax
- Polishing cloth
- Polishing papers
- Sandpaper: various grits
- Scouring pad
- Steel burnisher
- Steel wool
- Tumbler, steel shot, burnishing compound
- Ultrasonic cleaner

STATEMENT OF OWNERSHIP, MANAGEMENT, AND CIRCULATION
(Required by 39 USC 3685)

1. Publication title: *Art Jewelry*
2. Publication Number: 022-902
3. Filing date: October 1, 2015
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11. Known bondholders, mortgagees, and other security holders owning or holding one percent or more of total amount of bonds, mortgages, or other securities: N/A
12. Tax status: N/A
13. Publication title: *Art Jewelry*
14. Issue date for circulation data below: 9/2015
15. Extent and nature of circulation:

		Average no. copies each issue during preceding 12 months	Actual no. copies of each issue published nearest to filing date
A.	Total number of copies (net press run)	33,456	30,582
B.	Paid and/or requested circulation		
	1. Outside-county mail subscriptions	14,935	14,392
	2. In-county subscriptions	0	0
	3. Sales through dealers and carriers, street vendors, counter sales, and other non-UPSP paid distribution outside USPS	4,298	3,179
	4. Other classes mailed through the USPS	0	0
C.	Total paid/requested circulation	19,223	17,571
D.	Free distribution		
	1. Outside-county free distribution	0	0
	2. In-county free distribution	0	0
	3. Free distribution through the USPS	70	66
	4. Other non-USPS free distribution	125	0
E.	Total free distribution	195	66
F.	Total distribution	19,428	17,637
G.	Copies not distributed	14,028	12,945
H.	Total (sum of 15F and G)	33,456	30,582
I.	Percent paid and/or requested	99.00%	99.63%

16. Electronic circulation:

		Average no. copies each issue during preceding 12 months	Actual no. copies of each issue published nearest to filing date
A.	Paid electronic copies	5,468	5,193
B.	Total paid print copies + paid electronic copies	24,701	22,764
C.	Total print distribution + paid electronic copies	24,896	22,830
D.	Percent paid (both print & electronic copies)	99.22%	99.71%

I certify that all information furnished on this form is true and complete.
Nicole McGuire, VP Consumer Marketing. Date: September 29, 2015.

safety basics

Metals

- Wear eye protection at all times while working with metals, wire, and metalsmithing tools.
- Wear a non-flammable apron to protect your clothing.
- Tie back long hair.
- Work in a well-ventilated area at all times.
- Wear closed-toe shoes.
- Do not wear clothing or jewelry that might get caught in machinery or catch fire.

All media

- Wear a dust mask while working with materials and tools that generate particulates.
- Read all Safety Data Sheets (SDSs) before using a new material, and keep a copy of the SDS for any material you use.
- Do not use tools or chemicals in ways that are contrary to the manufacturer's intended purpose.
- Wear protective gloves while handling caustic materials or chemicals.
- Keep a properly rated fire extinguisher and a source of clean water near your workstation.
- Keep cutting tools sharp and all tools and equipment properly maintained. AJ

contacts

When contacting artists via email, please put "***Art Jewelry***" in the subject line.

GALLERY
page 39
- Sarah Chapman, www.chapmanmetals.com; sarah@chapmanmetals.com
- Janine DeCresenzo, janine.decresenzo.com; janine@decresenzo.com
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- Robert Grey Kaylor, www.realsteeldesign.com; robk@rgreygallery.com
- Nan Blair, www.blairmetalsmith.com; dnblair@msn.com
- Anna Mazoń, www.drakonaria.com
- Rebecca Myers, www.rebeccamyersdesign.com

suppliers

MAKE POWDER-COATED OMBRÉ EARRINGS
page 32
- Polyester tape: Eastwood, www.eastwood.com
- Powder coat: Powder Buy the Pound, www.powderbuythepound.com
- Wire, earring posts, and tools: Metalliferous, www.metalliferous.com

SUPERCHARGE YOUR SEALANT! POWDER-COAT YOUR PATINA!
page 36
- Craftsman Powder Coating System: www.ebay.com
- Powders: Columbia Coatings, www.columbiacoatings.com

SOLDERING HIDDEN JOINS
page 44
- All tools and materials: Rio Grande, www.riogrande.com, 800.545.6566; or Otto Frei, www.ottofrei.com

CREATE KINETIC WIRE CLUSTER EARRINGS
page 56
- All materials, tools, and supplies: any local or online jewelry-tool supplier

BOXES & LOCKETS: MARQUISE BOX
page 60
- Silver, flux, solder, tools: Rio Grande, www.riogrande.com, 800.545.6566
- Half-round pliers, parallel pliers, assorted hand tools: Grobet, www.grobetusa.com
- 220-grit adhesive sandpaper rounds: Home Depot, www.homedepot.com

To download this page for the January 2016 issue, visit **www.artjewelrymag.com/contacts-suppliers**.

coming in the March 2016 issue

OUR EDUCATION ISSUE: see new ways educators are reaching out!

PLUS
3 new ways to add a touch of gold without breaking the bank

Photo by Kazuhiko Ichikawa.

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advertiser index

classes & workshops section

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denotes full page ad

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SHOP DIRECTORY ads are $235 for six consecutive issues, payable in advance, or $44 per issue (billed to established accounts for one year minimum). Color available for an additional $10 per issue. Street address must be listed in the ad. No mention of mail order or wholesale business permitted. Send your ad to: *Art Jewelry* Shop Directory, P.O. Box 1612, Waukesha, WI 53187-1612, or call 1-888-558-1544, Ext. 815

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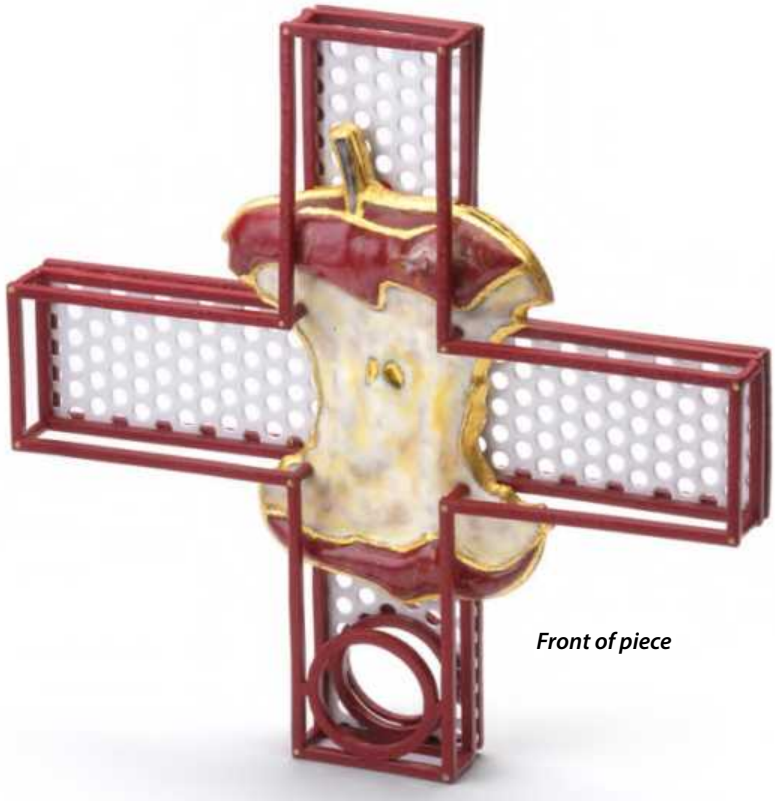
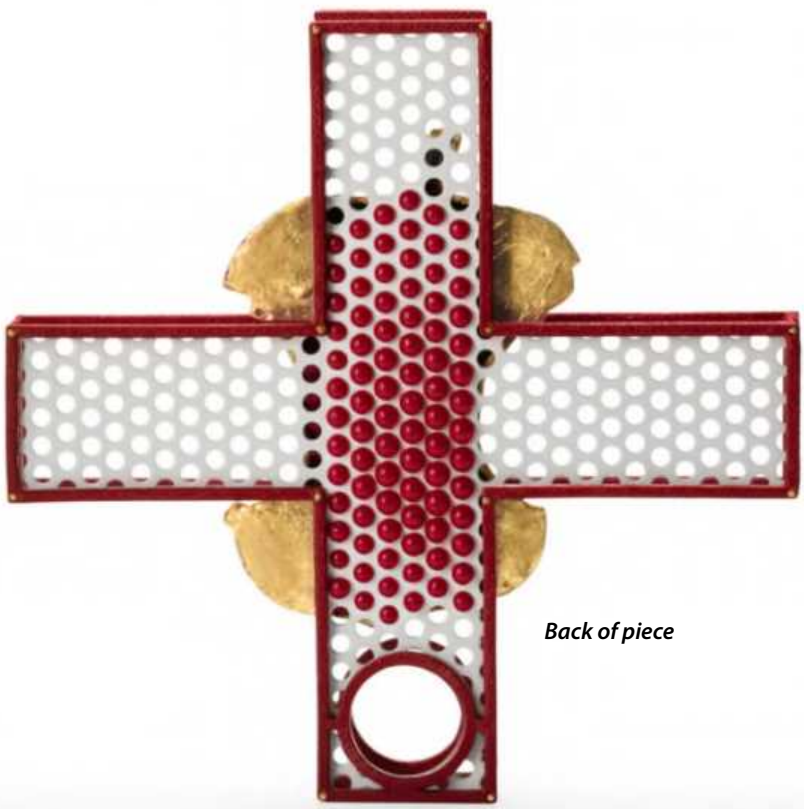


Front of piece



Back of piece

What's that Phrase About Apples?

Ah, right. "An apple a day keeps the doctor away." In this ring of the same name, **Kelly Miller** brings together her love of Pop Art, medical advertisements, and folklore. At the front and center of the ring, the realistic, enameled-copper apple represents the forbidden fruit, depicted as fully consumed and beginning to rot. The red frame is a perfectly square cross that brings to mind the American Red Cross — but the religious connotation is not lost on Miller, and the back reveals this.

Oozing through the perforated white, powder-coated aluminum to the back of the ring — the side that would face the wearer when worn on an outstretched hand — is bright red dyed and cast urethane foam. This blood-like element not only references the prevalent American Red Cross blood-donation events around the country, but also makes reference to Christianity. —*Annie Pennington*

AT A GLANCE

Title: *An Apple a Day Keeps the Dr. Away* (ring)
Artist: Kelly Miller
Info: Copper, aluminum, brass, gold foil, enamel, powder coat, dyed and cast urethane foam; 5 1/16 x 5 1/16 x 5/8 in. (12.9 x 12.9 x 1.6 cm)
Contact: www.hammerstonemetal.com

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